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Title of Invention: Biosensor

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L77  ANSWER 1 OF 33  HCAPLUS  COPYRIGHT 2003 ACS
AN   2002:495714  HCAPLUS
DN   137:246666
TI   Quinohemoprotein alcohol dehydrogenase-based reagentless amperometric
     biosensor for ethanol monitoring during wine fermentation
AU   Niculescu, Mihaela; Erichsen, Thomas; Sukharev, Valentin;
     Kerenyi, Zoltan; Csoregi, Elisabeth; Schuhmann, Wolfgang
CS   Department of Biotechnology, Lund University, Lund, S-22100, Swed.
SO   Analytica Chimica Acta (2002), 463(1), 39-51
     CODEN: ACACAM; ISSN: 0003-2670
PB   Elsevier Science B.V.
DT   Journal
LA   English
CC   17-1 (Food and Feed Chemistry)
AB   This paper describes the development and optimization of an amperometric
     biosensor for monitoring ethanol in beverages.  The
     biosensor is constructed by crosslinking a quinoprotein alc.
     dehydrogenase (QH-ADH) to an Os-complex-modified poly(
     vinylimidazole) redox polymer using poly(
     ethylene glycol) diglycidyl ether.
     The optimum biosensor configuration was evaluated by changing
     the ratio between enzyme, redox polymer, and cross-linker using
     conventional graphite rods as basis electrodes.  The optimized
     sensor showed a sensitivity of 0.336.+-.0.025 A M-1 cm2 for ethanol and a
     detection limit (calcd. as three times the signal-to-noise ratio) of 1
     .mu.M.  This biosensor configuration was further evaluated in a
     conventional flow-injection system and the applicability for the detn. of
     ethanol in diverse wine samples could be successfully demonstrated.
     Adaptation of this sensor configuration to screen-printed (SP) electrodes
     allowed their integration into an automated sequential-injection analyzer
     and the successful online monitoring of ethanol during wine fermn.
     processes.
ST   ethanol detn wine quinohemoprotein alc dehydrogenase amperometric
     biosensor
IT   Enzyme electrodes
        (amperometric; quinohemoprotein alc. dehydrogenase-based reagentless
        amperometric biosensor for ethanol monitoring during wine
```

fermn.)
IT Wine
(quinohemoprotein alc. dehydrogenase-based reagentless amperometric **biosensor** for ethanol monitoring during wine fermn.)
IT **26403-72-5, Poly(ethylene glycol) diglycidyl ether**
RL: MOA (Modifier or additive use); USES (Uses)
(crosslinking agent; quinohemoprotein alc. dehydrogenase-based reagentless amperometric **biosensor** for ethanol monitoring during wine fermn.)
IT 64-17-5, Ethanol, analysis
RL: ANT (Analyte); ANST (Analytical study)
(quinohemoprotein alc. dehydrogenase-based reagentless amperometric **biosensor** for ethanol monitoring during wine fermn.)
IT 37205-43-9, Quinohemoprotein alcohol dehydrogenase
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(quinohemoprotein alc. dehydrogenase-based reagentless amperometric **biosensor** for ethanol monitoring during wine fermn.)
IT **7440-04-2D, Osmium**, poly(**vinylimidazole**) complexes **25232-42-2D**, Poly(**vinylimidazole**), **osmium** complexes
RL: TEM (Technical or engineered material use); USES (Uses)
(quinohemoprotein alc. dehydrogenase-based reagentless amperometric **biosensor** for ethanol monitoring during wine fermn.)
RE.CNT 25 THERE ARE 25 CITED REFERENCES AVAILABLE FOR THIS RECORD
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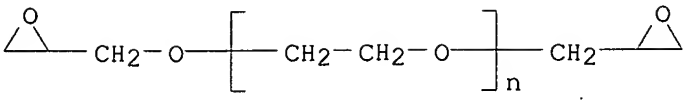
IT **26403-72-5, Poly(ethylene glycol) diglycidyl ether**
RL: MOA (Modifier or additive use); USES (Uses)
(crosslinking agent; quinohemoprotein alc. dehydrogenase-based reagentless amperometric **biosensor** for ethanol monitoring during wine fermn.)
RN 26403-72-5 HCAPLUS
CN Poly(oxy-1,2-ethanediyl), .alpha.-(oxiranylmethyl)-.omega.-(oxiranylmethoxy)- (9CI) (CA INDEX NAME)



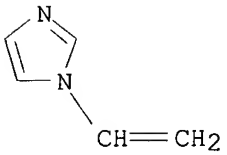
IT **7440-04-2D, Osmium**, poly(**vinylimidazole**) complexes **25232-42-2D**, Poly(**vinylimidazole**), **osmium** complexes
RL: TEM (Technical or engineered material use); USES (Uses)
(quinohemoprotein alc. dehydrogenase-based reagentless amperometric **biosensor** for ethanol monitoring during wine fermn.)
RN 7440-04-2 HCAPLUS
CN Osmium (8CI, 9CI) (CA INDEX NAME)

Os

RN 25232-42-2 HCAPLUS
CN 1H-Imidazole, 1-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 1072-63-5
CMF C5 H6 N2



L77 ANSWER 2 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 2002:283240 HCAPLUS
DN 137:19560
TI **Redox hydrogel**-based bienzyme microelectrodes for amperometric monitoring of L-glutamate
AU Mikeladze, Ekaterina; Schulte, Albert; Mosbach, Marcus; Blochl, Andrea; **Csoregi, Elisabeth**; Solomonia, Revaz; Schuhmann, Wolfgang
CS Biochemical Neuropharmacology, Institute of Physiology, Georgian Academy of Sciences, Tbilisi, 380060, Georgia
SO Electroanalysis (2002), 14(6), 393-399
CODEN: ELANEU; ISSN: 1040-0397
PB Wiley-VCH Verlag GmbH
DT Journal
LA English
CC 17-1 (Food and Feed Chemistry)
AB Fabrication and characterization of amperometric bienzyme L-glutamate sensitive microelectrodes are the prerequisite for monitoring changes of L-glutamate concn. at glutamate-secreting cell cultures. The design of the glutamate microelectrodes is based on incorporating L-glutamate **oxidase** and **horseradish peroxidase** into a **redox-hydrogel** contg. PVI19-dmeOs as the **redox** mediator and immobilizing this system onto the surface of **platinum** microdisk electrodes using a dip-coating procedure. For amperometric measurements of L-glutamate, these **redox hydrogel** -based bienzyme microelectrodes can be operated at low working potentials (-50 mV vs. **Ag**/AgCl) decreasing the influence of electroactive

interferants possibly present in biol. samples. The L-glutamate microsensors are characterized by a good operation stability and sensitivity (0.038.+-.0.005 mAM-1), a low detection limit (0.5 .mu.M in a conventional amperometric set-up and 0.03 .mu.M in a Faraday cage, defined as three times the signal-to-noise ratio), a linear range up to 50 .mu.M and a response time of about 35 s. The glutamate **biosensors** have been applied for the direct measurement of L-glutamate release (upon chem. stimulation) from a population of immortalized hippocampal neurons (HN10 cells) demonstrating the possibility to amperometrically monitor in-situ L-glutamate secretion from these cells.

ST glutamate amperometric enzyme microelectrode

IT Enzyme electrodes
(amperometric; **redox hydrogel**-based bienzyme microelectrodes for amperometric monitoring of L-glutamate)

IT Microelectrodes
(enzyme; **redox hydrogel**-based bienzyme microelectrodes for amperometric monitoring of L-glutamate)

IT Brain
(hippocampus; **redox hydrogel**-based bienzyme microelectrodes for amperometric monitoring of L-glutamate)

IT Enzyme electrodes
(microelectrodes; **redox hydrogel**-based bienzyme microelectrodes for amperometric monitoring of L-glutamate)

IT **9003-99-0, Peroxidase**
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(**horseradish**; **redox hydrogel**-based bienzyme microelectrodes for amperometric monitoring of L-glutamate)

IT 56-86-0, L-Glutamic acid, analysis
RL: ANT (Analyte); ANST (Analytical study)
(**redox hydrogel**-based bienzyme microelectrodes for amperometric monitoring of L-glutamate)

IT 39346-34-4, L-Glutamate **oxidase**
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(**redox hydrogel**-based bienzyme microelectrodes for amperometric monitoring of L-glutamate)

RE.CNT 40 THERE ARE 40 CITED REFERENCES AVAILABLE FOR THIS RECORD

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IT **9003-99-0, Peroxidase**
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(**horseradish; redox hydrogel**-based bienzyme microelectrodes for amperometric monitoring of L-glutamate)
RN 9003-99-0 HCAPLUS
CN Peroxidase (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L77 ANSWER 3 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 2002:205115 HCAPLUS
DN 137:108425
TI Amperometric enzyme-based **biosensors** for application in food and beverage industry
AU **Csoregi, Elisabeth**; Gaspar, Szilveszter; **Niculescu, Mihaela**; Mattiasson, Bo; Schuhmann, Wolfgang
CS Centre for Chemistry and Chemical Engineering, Department of Biotechnology, Lund University, Lund, 221 00, Swed.
SO Focus on Biotechnology (2001), 7(Physics and Chemistry: Basis of Biotechnology), 105-129
CODEN: FBOIAM
PB Kluwer Academic Publishers
DT Journal; General Review
LA English
CC 17-0 (Food and Feed Chemistry)
AB A review. Continuous, sensitive, selective, and reliable monitoring of a large variety of different compds. in various food and beverage samples is of increasing importance to assure a high-quality and tracing of any possible source of contamination of food and beverages. Most of the presently used classical anal. methods are often requiring expensive instrumentation, long anal. times and well-trained staff. Amperometric enzyme-based **biosensors** on the other hand have emerged in the last decade from basic science to useful tools with very promising application possibilities in food and beverage industry. Amperometric **biosensors** are in general highly selective, sensitive, relatively cheap, and easy to integrate into continuous anal. systems. A successful application of such sensors for industrial purposes, however, requires a sensor design, which satisfies the specific needs of monitoring the targeted analyte in the particular application. Since each individual application needs different operational conditions and sensor characteristics, it is obvious that **biosensors** have to be tailored for the particular case. The characteristics of the **biosensors** are depending on the used biorecognition element (enzyme), nature of signal transducer (electrode material) and the communication between these two elements (electron-transfer pathway). Therefore, the present chapter presents the different existing **biosensor** designs describing the possible electron-transfer pathways, discusses their advantages and disadvantages, and shows their possible application in food and beverage industry. Three practical

examples are given describing **biosensor** designs developed in our lab., demonstrating their usefulness for industrial applications.
ST review amperometric enzyme **biosensor** food beverage analysis
IT Beverages
Food analysis
Food industry
Quality control
(amperometric enzyme-based **biosensors** for application in food and beverage industry)
IT **Biosensors**
(**amperometric**; **amperometric** enzyme-based **biosensors** for application in food and beverage industry)
IT **Biosensors**
(**enzymic, electrochem.**; **amperometric** enzyme-based **biosensors** for application in food and beverage industry)
RE.CNT 91 THERE ARE 91 CITED REFERENCES AVAILABLE FOR THIS RECORD
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L77 ANSWER 4 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 2002:115443 HCAPLUS
DN 136:213052
TI Direct bioelectrocatalysis at carbon electrodes modified with quinohemoprotein alcohol dehydrogenase from Gluconobacter sp. 33
AU Razumiene, J.; **Niculescu, M.**; Ramanavicius, A.; Laurinavicius, V.; **Csoregi, E.**
CS Institute of Biochemistry Vilnius, Vilnius, LT-2600, Lithuania
SO Electroanalysis (2002), 14(1), 43-49
CODEN: ELANEU; ISSN: 1040-0397
PB Wiley-VCH Verlag GmbH
DT Journal
LA English
CC 9-7 (Biochemical Methods)
AB A newly isolated, purified, and characterized PQQ-dependent alc.

dehydrogenase (a bacterial membrane-bound protein) was recently found to display a surprisingly large linear range and high selectivity towards ethanol when integrated into a conducting **polymer** network on a **platinum** electrode. These findings motivated us to study the enzyme when simply immobilized onto carbonaceous surfaces in order to establish its characteristics and suitability for sensor development, the sensor design being based on a direct-electron transfer pathway. **Graphite** rods and screen-printed electrodes were modified in two different ways, and were operated both in FIA and batch mode. The obtained **biosensor** characteristics were highly dependent on the sensor architecture, the highest sensitivity (179 mA M-1 cm-2) and lowest detection limit (1 .mu.M) being obtained for screen-printed electrodes used in a batch mode. A mechanism of the obsd. direct electron transfer between the enzyme's active center and the electrode is proposed.

ST bioelectrocatalysis carbon electrode quinohemoprotein alc dehydrogenase

IT Conducting **polymers**
Enzyme electrodes
Gluconobacter
Immobilization, molecular
Screen printing
(bioelectrocatalysis at carbon electrodes modified with quinohemoprotein alc. dehydrogenase from Gluconobacter sp. 33)

IT Catalysis
(electrocatalysis; bioelectrocatalysis at carbon electrodes modified with quinohemoprotein alc. dehydrogenase from Gluconobacter sp. 33)

IT 64-17-5, Ethanol, analysis
RL: ANT (Analyte); ANST (Analytical study)
(bioelectrocatalysis at carbon electrodes modified with quinohemoprotein alc. dehydrogenase from Gluconobacter sp. 33)

IT 37205-43-9, E.C.1.1.99.8
RL: ARG (Analytical reagent use); PEP (Physical, engineering or chemical process); PYP (Physical process); ANST (Analytical study); PROC (Process); USES (Uses)
(bioelectrocatalysis at carbon electrodes modified with quinohemoprotein alc. dehydrogenase from Gluconobacter sp. 33)

IT 72909-34-3, PQQ
RL: ARU (Analytical role, unclassified); ANST (Analytical study)
(bioelectrocatalysis at carbon electrodes modified with quinohemoprotein alc. dehydrogenase from Gluconobacter sp. 33)

IT 30604-81-0, Polypyrrole
RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)
(bioelectrocatalysis at carbon electrodes modified with quinohemoprotein alc. dehydrogenase from Gluconobacter sp. 33)

IT **7440-06-4, Platinum**, uses **7440-44-0**, Carbon, uses **7440-57-5, Gold**, uses **7782-42-5, Graphite**, uses
RL: DEV (Device component use); USES (Uses)
(bioelectrocatalysis at carbon electrodes modified with quinohemoprotein alc. dehydrogenase from Gluconobacter sp. 33)

RE.CNT 46 THERE ARE 46 CITED REFERENCES AVAILABLE FOR THIS RECORD

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IT **7440-06-4**, **Platinum**, uses **7440-44-0**, Carbon, uses **7440-57-5**, **Gold**, uses **7782-42-5**, **Graphite**, uses
RL: DEV (Device component use); USES (Uses)
(bioelectrocatalysis at carbon electrodes modified with quinohemoprotein alc. dehydrogenase from Gluconobacter sp. 33)

RN 7440-06-4 HCAPLUS
CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

RN 7440-44-0 HCAPLUS
CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

RN 7440-57-5 HCAPLUS
CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

RN 7782-42-5 HCAPLUS
CN Graphite (8CI, 9CI) (CA INDEX NAME)

C

L77 ANSWER 5 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 2001:482681 HCAPLUS
DN 135:207620
TI Detection of histamine and other biogenic amines using **biosensors** based on **amine oxidase**
AU **Niculescu, M.**; Nistor, C.; Ruzgas, T.; **Frebort, I.**; Sebela, M.; Pec, P.; **Csoregi, El.**
CS Department of Biotechnology, Lund University, Lund, S-22100, Swed.
SO Inflammation Research (2001), 50(Suppl. 2), S146-S148
CODEN: INREFB; ISSN: 1023-3830
PB Birkhaeuser Verlag
DT Journal
LA English
CC 9-2 (Biochemical Methods)
Section cross-reference(s): 2
AB The authors have developed two types of **amine oxidase** -based **biosensors**: a monoenzymic and a bienzymic one, the latter being based on co-immobilized **amine oxidase** (AO) and **horseradish peroxidase** (HRP). The design of the **sensor** is either based on a direct electron transfer or a mediated one. In general the bienzymic **biosensors** showed superior **electrode** characteristics than the monoenzymic ones, both for unmediated and mediated types (e.g., higher sensitivity, lower detection limit, larger dynamic range, etc.). However, the optimized monoenzymic **biosensor** surprisingly displayed very low sensitivity for putrescine in comparison with histamine. To clarify the obsd. difference in selectivity, the electron transfer mechanism of the two **electrode** types has to be elucidated. The present work targeted the interpretation of hypotheses explaining the possible electron transfer mechanism for the monoenzymic **biosensor**. When recording the current signals for various amines, the unmediated bienzymic (AO-HRP) **biosensor** followed the substrate specificity of the enzyme in soln., whereas the monoenzymic (AO) **biosensor** showed remarkably changed selectivity, responding mainly to histamine, cystamine and tyramine. The obtained results suggest that the electron transfer mechanism is a mixt. between a direct and an internally mediated one (via the electro-oxidn. of the formed product). However, the AO **electrode** is the first example when a **copper** AO can work anaerobically. An exptl. setup consisting of AO and AO-HRP **electrodes** can be thus used for the selective detection of histamine and diamines (putrescine and cadaverine) due to the difference in their selectivity pattern.
ST biogenic amine **biosensor amine oxidase**; histamine biogenic amine **biosensor amine oxidase**
IT Amines, analysis
RL: ANT (Analyte); ANST (Analytical study)
(biogenic; detection of histamine and other biogenic amines using **biosensors** based on **amine oxidase**)
IT **Biosensors**
(detection of histamine and other biogenic amines using **biosensors** based on **amine oxidase**)
IT Electron transfer
(detection of histamine and other biogenic amines using **biosensors** based on **amine oxidase** in

relation to electron transfer)
IT 51-45-6, Histamine, analysis 51-67-2, Tyramine 51-85-4, Cystamine 107-15-3, Ethylenediamine, analysis 110-60-1, Putrescine 124-20-9, Spermidine 306-60-5, Agmatine 462-94-2, Cadaverine 40794-72-7 40930-37-8
RL: ANT (Analyte); ANST (Analytical study)
(detection of histamine and other biogenic amines using **biosensors** based on **amine oxidase**)
IT **9059-11-4, Amine oxidase**
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(detection of histamine and other biogenic amines using **biosensors** based on **amine oxidase**)
RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
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IT **9059-11-4, Amine oxidase**
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(detection of histamine and other biogenic amines using **biosensors** based on **amine oxidase**)
RN 9059-11-4 HCAPLUS
CN Oxidase, amine (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L77 ANSWER 6 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 2001:451092 HCAPLUS
DN 135:58124
TI **Sensor** element and its manufacturing method
IN Rui, Masao
PA Toto Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 11 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM G01N027-327
CC 9-1 (Biochemical Methods)
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 2001165892	A2	20010622	JP 1999-347027	19991207
PRAI JP 1999-347027		19991207		

AB A **sensor** element used for an electrochem. measuring system is provided. In this **sensor** element, a responsive layer contg. a biocatalyst (e.g., glucose **oxidase**, uricase, glutamate **oxidase**, L-amino acid **oxidase**, D-amino acid **oxidase**, alc. **oxidase**, bilirubin **oxidase**, **amine oxidase**, cholesterol **oxidase**, choline **oxidase**, xanthine **oxidase**, pyruvate **oxidase**, lactate **oxidase**) capable of recognizing a target substance, and a selective permeable membrane for selectively prohibiting the permeation of a coexisting interfering substance causative of an undesirable electrochem. reaction are strongly held on the surface of its electricity collector by a phys. or chem. force. This capability is provided by processing at least a surface part of the electricity collector and turning it into a mixt. of metal (e.g, **platinum**, **gold**, **silver**, **palladium**, **osmium**, iridium,

carbon, nickel, iron, lead, **copper**), an inorg. substance (e.g., silicon, titanium, aluminum, tantalum) and an org. substance. Diagrams describing the **sensor** assembly are given.

ST electrochem **sensor** transducer enzyme **electrode** metal

IT **Sensors**
Transducers
(electrochem.; **sensor** element and manufg. method)

IT Annealing
(plasma; **sensor** element and manufg. method)

IT Annealing
Coating process
Enzyme **electrodes**
Immobilization, biochemical
Membranes, nonbiological
Permeability
(**sensor** element and manufg. method)

IT Enzymes, uses
RL: ARG (Analytical reagent use); PEP (Physical, engineering or chemical process); ANST (Analytical study); PROC (Process); USES (Uses)
(**sensor** element and manufg. method)

IT Metals, uses
RL: DEV (Device component use); USES (Uses)
(**sensor** element and manufg. method)

IT Electrochemical cells
(transducers; **sensor** element and manufg. method)

IT 9035-73-8, **Oxidase**
RL: ARG (Analytical reagent use); PEP (Physical, engineering or chemical process); ANST (Analytical study); PROC (Process); USES (Uses)
(hydrogen peroxide-forming; **sensor** element and manufg. method)

IT 9000-88-8, D-Amino acid **oxidase** 9000-89-9, L-Amino acid **oxidase** 9001-37-0, Glucose **oxidase** 9001-96-1, Pyruvate **oxidase** 9002-12-4, Uricase 9002-17-9, Xanthine **oxidase** 9028-67-5, Choline **oxidase** 9028-72-2, Lactate **oxidase** 9028-76-6, Cholesterol **oxidase** **9059-11-4**, **Amine oxidase** 9073-63-6, Alcohol **oxidase** 39346-34-4, Glutamate **oxidase** 80619-01-8, Bilirubin **oxidase**
RL: ARG (Analytical reagent use); PEP (Physical, engineering or chemical process); ANST (Analytical study); PROC (Process); USES (Uses)
(**sensor** element and manufg. method)

IT 7429-90-5, Aluminum, uses 7439-88-5, Iridium, uses 7439-89-6, Iron, uses 7439-92-1, Lead, uses 7440-02-0, Nickel, uses **7440-04-2**, **Osmium**, uses **7440-05-3**, **Palladium**, uses **7440-06-4**, **Platinum**, uses 7440-21-3, Silicon, uses **7440-22-4**, **Silver**, uses 7440-25-7, Tantalum, uses 7440-32-6, Titanium, uses **7440-44-0**, **Carbon**, uses **7440-50-8**, **Copper**, uses **7440-57-5**, **Gold**, uses
RL: DEV (Device component use); USES (Uses)
(**sensor** element and manufg. method)

IT **9059-11-4**, **Amine oxidase**
RL: ARG (Analytical reagent use); PEP (Physical, engineering or chemical process); ANST (Analytical study); PROC (Process); USES (Uses)
(**sensor** element and manufg. method)

RN 9059-11-4 HCAPLUS

CN Oxidase, amine (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **7440-04-2**, **Osmium**, uses **7440-05-3**, **Palladium**, uses **7440-06-4**, **Platinum**, uses **7440-22-4**, **Silver**, uses **7440-44-0**, **Carbon**, uses **7440-50-8**, **Copper**, uses

7440-57-5, Gold, uses
RL: DEV (Device component use); USES (Uses)
(**sensor** element and manufg. method)
RN 7440-04-2 HCAPLUS
CN Osmium (8CI, 9CI) (CA INDEX NAME)

Os

RN 7440-05-3 HCAPLUS
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

RN 7440-06-4 HCAPLUS
CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

RN 7440-22-4 HCAPLUS
CN Silver (8CI, 9CI) (CA INDEX NAME)

Ag

RN 7440-44-0 HCAPLUS
CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

RN 7440-50-8 HCAPLUS
CN Copper (7CI, 8CI, 9CI) (CA INDEX NAME)

Cu

RN 7440-57-5 HCAPLUS
CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

L77 ANSWER 7 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 2001:343486 HCAPLUS
DN 135:2401
TI Interference elimination in glutamate monitoring with chip integrated enzyme microreactors
AU Collins, A.; Mikeladze, E.; Bengtsson, M.; Kokaia, M.; Laurell, T.; **Csoregi, E.**
CS Department of Biotechnology, Lund University, Lund, S-22100, Swed.
SO Electroanalysis (2001), 13(6), 425-431
CODEN: ELANEU; ISSN: 1040-0397

PB Wiley-VCH Verlag GmbH
DT Journal
LA English
CC 9-1 (Biochemical Methods)
AB On-chip enzyme reactors are often used in medical/pharmaceutical anal. due to their inherent advantages, such as high sample throughput, low reagent consumption, stability, reproducibility and low cost. The present work describes a different application of such microreactors, namely, elimination of interfering ascorbate signals in glutamate monitoring using ascorbate **oxidase** modified silicon chip microreactors of different sizes (5.3 and 0.95 .mu.L). Glutamate was monitored with a previously developed **redox hydrogel** integrated bienzyme electrode, based on coupled glutamate **oxidase** and **horseradish peroxidase**, inserted in a miniaturized flow cell operated at - 50 mV (vs. **Ag**/AgCl). The developed online anal. system was characterized with regard to diln. effects, detection limit, response time and interference ability using model solns. and real samples. Off-line in vivo glutamate measurements could be made by injecting rat brain microdialyzate samples collected before and after KCl stimulation without any interference of ascorbate. Within the studied flow rate range (2-25 .mu.L/min), 1 mM and 200 .mu.M ascorbate could be totally eliminated using the larger and the smaller microreactor, resp.
ST glutamate biochip integrated enzyme microreactor interference elimination
IT Bioreactors
Biosensors
Enzyme electrodes
Immobilization, biochemical
Interference
(glutamate monitoring with chip integrated enzyme microreactors)
IT 56-86-0, Glutamic acid, analysis
RL: ANT (Analyte); ANST (Analytical study)
(glutamate monitoring with chip integrated enzyme microreactors)
IT 39346-34-4, Glutamate **oxidase**
RL: ARG (Analytical reagent use); PEP (Physical, engineering or chemical process); ANST (Analytical study); PROC (Process); USES (Uses)
(glutamate monitoring with chip integrated enzyme microreactors)
IT 50-81-7, Ascorbic acid, analysis
RL: ARU (Analytical role, unclassified); ANST (Analytical study)
(glutamate monitoring with chip integrated enzyme microreactors)
IT 7440-21-3, Silicon, uses
RL: DEV (Device component use); USES (Uses)
(glutamate monitoring with chip integrated enzyme microreactors)
IT **9003-99-0, Peroxidase**
RL: ARG (Analytical reagent use); PEP (Physical, engineering or chemical process); ANST (Analytical study); PROC (Process); USES (Uses)
(**horseradish**; glutamate monitoring with chip integrated enzyme microreactors)
RE.CNT 54 THERE ARE 54 CITED REFERENCES AVAILABLE FOR THIS RECORD
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IT **9003-99-0, Peroxidase**
RL: ARG (Analytical reagent use); PEP (Physical, engineering or chemical process); ANST (Analytical study); PROC (Process); USES (Uses)
(**horseradish**; glutamate monitoring with chip integrated enzyme microreactors)
RN 9003-99-0 HCAPLUS
CN Peroxidase (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L77 ANSWER 8 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 2001:88137 HCAPLUS
DN 134:216600
TI An oxygen-independent ethanol sensor based on quinohemoprotein alcohol dehydrogenase covalently bound to a functionalized polypyrrole film
AU Ramanavicius, A.; Habermuller, K.; Razumiene, J.; Meskys, R.; Marcinkeviciene, L.; Bachmatova, I.; **Csoregi, E.**; Laurinavicius, V.; Schuhmann, W.
CS Laboratory of Bioanalysis, Institute of Biochemistry, Vilnius, 2600, Lithuania
SO Progress in Colloid & Polymer Science (2000), 116(Surface and Colloid Science), 143-148
CODEN: PCPSD7; ISSN: 0340-255X

PB Springer
DT Journal
LA English
CC 80-2 (Organic Analytical Chemistry)
Section cross-reference(s): 9, 72
AB The characteristics of a phenazine methosulfate mediated alc. **biosensor** based on a newly isolated quinohemoprotein alc. dehydrogenase are described. The enzyme was covalently linked at a functionalized polypyrrole film which had been electrochem. deposited on the surface of a **platinum**-black electrode. The **biosensor** architecture developed was characterized with regard to sensitivity, selectivity, and long-term operational stability. Owing to the inherent properties of the new enzyme the related **biosensors** are oxygen-independent and exhibit improved selectivity to ethanol in contrast to alc. **biosensors** based on alc. **oxidase** or on cationic NAD dependent alc. dehydrogenase.
ST ethanol **biosensor** alc dehydrogenase functionalized polypyrrole
IT Enzyme electrodes
(amperometric; oxygen-independent ethanol sensor based on quinohemoprotein alc. dehydrogenase covalently bound to a functionalized polypyrrole film)
IT **Biosensors**
Cyclic voltammetry
(oxygen-independent ethanol sensor based on quinohemoprotein alc. dehydrogenase covalently bound to a functionalized polypyrrole film)
IT Alcohols, analysis
RL: ARU (Analytical role, unclassified); ANST (Analytical study)
(response of oxygen-independent ethanol sensor based on quinohemoprotein alc. dehydrogenase covalently bound to a functionalized polypyrrole film to)
IT 109-97-7, Pyrrole 3251-23-8
RL: ARU (Analytical role, unclassified); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent)
(in prepn. of oxygen-independent ethanol sensor based on quinohemoprotein alc. dehydrogenase covalently bound to a functionalized polypyrrole film)
IT 64-17-5, Ethanol, analysis
RL: ANT (Analyte); ANST (Analytical study)
(oxygen-independent ethanol sensor based on quinohemoprotein alc. dehydrogenase covalently bound to a functionalized polypyrrole film)
IT 9031-72-5, Alcohol dehydrogenase 30604-81-0, Polypyrrole
RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)
(oxygen-independent ethanol sensor based on quinohemoprotein alc. dehydrogenase covalently bound to a functionalized polypyrrole film)
IT **7440-06-4**, **Platinum**-black, analysis
RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)
(**platinum**-black electrode; oxygen-independent ethanol sensor based on quinohemoprotein alc. dehydrogenase covalently bound to a functionalized polypyrrole film)
IT 67-56-1, Methanol, analysis 71-23-8, 1-Propanol, analysis 71-36-3, 1-Butanol, analysis 78-83-1, Isobutanol, analysis
RL: ARU (Analytical role, unclassified); ANST (Analytical study)
(response of oxygen-independent ethanol sensor based on quinohemoprotein alc. dehydrogenase covalently bound to a functionalized polypyrrole film to)
RE.CNT 34 THERE ARE 34 CITED REFERENCES AVAILABLE FOR THIS RECORD
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IT **7440-06-4**, **Platinum**-black, analysis
RL: ARU (Analytical role, unclassified); DEV (Device component use); ANST (Analytical study); USES (Uses)
(**platinum**-black electrode; oxygen-independent ethanol sensor based on quinohemoprotein alc. dehydrogenase covalently bound to a functionalized polypyrrole film)

RN 7440-06-4 HCAPLUS
CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

L77 ANSWER 9 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 2001:88010 HCAPLUS
DN 134:219097
TI Hydrogen peroxide sensitive **biosensor** based on plant **peroxidases** entrapped in **Os**-modified polypyrrole films
AU Gaspar, Szilveszter; Habermuller, Katja; **Csoregi, Elisabeth**; Schuhmann, Wolfgang
CS Department of Biotechnology, University of Lund, Lund, S-22100, Swed.
SO Sensors and Actuators, B: Chemical (2001), B72(1), 63-68
CODEN: SABCEB; ISSN: 0925-4005
PB Elsevier Science S.A.
DT Journal
LA English
CC 9-1 (Biochemical Methods)
AB An amperometric hydrogen peroxide **biosensor** was designed based on **horseradish** and **tobacco peroxidase** entrapped into a conducting redox-**polymer** immobilized on either glassy-carbon or **platinum** electrodes. A versatile one-step

immobilization method was carried out based on the electrochem. **polymn.** of a pyrrole monomer functionalized with an **Os** -complex. Cyclic voltammetry and const. potential amperometry performed with the different **peroxidases** in soln. or entrapped within the conducting redox-**polymer** film suggests that the redox center within the active site of **horseradish peroxidase** exhibits a better accessibility for the either free-diffusing or **polymer**-bound **Os**-complexes than that of **tobacco peroxidase**. Therefore, the obtained sensitivities for the redn. of H2O2 are significantly higher for the HRP-based sensors as compared with the **tobacco peroxidase**-based ones. The direct redn. of H2O2 on the **polymer** backbone was identified as a side reaction even though the bioelectroredn. through **horseradish peroxidase** is a much more efficient reaction pathway.

ST hydrogen peroxide **biosensor** plant **peroxidase** **Os** polypyrrole electrode

IT Amperometry
Conducting **polymers**
Cyclic voltammetry
Horseradish (Armoracia lapathifolia)
Immobilization, biochemical
Tobacco
(hydrogen peroxide sensitive **biosensor** based on plant **peroxidases** entrapped in **Os**-modified polypyrrole films)

IT 7722-84-1, Hydrogen peroxide, analysis
RL: ANT (Analyte); ANST (Analytical study)
(hydrogen peroxide sensitive **biosensor** based on plant **peroxidases** entrapped in **Os**-modified polypyrrole films)

IT **9003-99-0, Peroxidase**
RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)
(hydrogen peroxide sensitive **biosensor** based on plant **peroxidases** entrapped in **Os**-modified polypyrrole films)

IT **7440-06-4, Platinum**, uses **7440-44-0**, Carbon, uses
RL: DEV (Device component use); USES (Uses)
(hydrogen peroxide sensitive **biosensor** based on plant **peroxidases** entrapped in **Os**-modified polypyrrole films)

IT 329353-89-1P
RL: DEV (Device component use); SPN (Synthetic preparation); PREP (Preparation); USES (Uses)
(hydrogen peroxide sensitive **biosensor** based on plant **peroxidases** entrapped in **Os**-modified polypyrrole films)

RE.CNT 38 THERE ARE 38 CITED REFERENCES AVAILABLE FOR THIS RECORD

RE

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IT **9003-99-0, Peroxidase**
RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)
(hydrogen peroxide sensitive **biosensor** based on plant **peroxidases** entrapped in **Os**-modified polypyrrole films)
RN 9003-99-0 HCAPLUS
CN Peroxidase (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **7440-06-4, Platinum**, uses **7440-44-0**, Carbon, uses
RL: DEV (Device component use); USES (Uses)
(hydrogen peroxide sensitive **biosensor** based on plant **peroxidases** entrapped in **Os**-modified polypyrrole films)
RN 7440-06-4 HCAPLUS
CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

RN 7440-44-0 HCAPLUS
CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

L77 ANSWER 10 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 2001:31711 HCAPLUS
DN 134:85306
TI **Biosensor** for determination of freshness biomarkers in food and beverage

IN **Csoregi, Elisabeth; Niculescu, Mihaela; Frebort, Ivo**
PA **Forskarpatent i Syd AB, Swed.**
SO PCT Int. Appl., 22 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM G01N
CC 17-1 (Food and Feed Chemistry)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2001002827	A2	20010111	WO 2000-SE1449	20000706 <--
	WO 2001002827	A3	20010628		
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG				
	AU 2000060439	A5	20010122	AU 2000-60439	20000706 <--
	EP 1198588	A2	20020424	EP 2000-946725	20000706 <--
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL				
PRAI	SE 1999-2608	A	19990706 <--		
	WO 2000-SE1449	W	20000706 <--		

AB The present invention relates to a **biosensor** for the detection and/or the detn. of freshness biomarkers in foods and beverages, comprising an **electrode** and a mono-enzyme system, such as an **amine oxidase**, or a bi-enzyme system of an **amine oxidase** and a **peroxidase**.

ST **biosensor electrode amine oxidase peroxidase** food freshness

IT **Electrodes**
(**bioelectrodes**; **biosensor** for detn. of freshness biomarkers in foods and beverages)

IT Amines, analysis
RL: ANT (Analyte); ANST (Analytical study)
(biogenic; **biosensor** for detn. of freshness biomarkers in foods and beverages)

IT Beverages
Blood analysis
Body fluid
Diagnosis
Dialysis fluids
Disease, animal
Electrodes
Fish
Food analysis
Meat
Saliva
Sweat
Urine analysis
(**biosensor** for detn. of freshness biomarkers in foods and beverages)

IT Enzymes, uses
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(**biosensor** for detn. of freshness biomarkers in foods and beverages)

IT **Carbon fibers**, uses

RL: DEV (Device component use); USES (Uses)
(**biosensor** for detn. of freshness biomarkers in foods and beverages)

IT **Paste electrodes**
(**carbon; biosensor** for detn. of freshness biomarkers in foods and beverages)

IT **Polymers**, uses
Salts, uses
RL: DEV (Device component use); USES (Uses)
(conducting; **biosensor** for detn. of freshness biomarkers in foods and beverages)

IT 51-45-6, Histamine, analysis 110-60-1, Putrescine
RL: ANT (Analyte); ANST (Analytical study)
(**biosensor** for detn. of freshness biomarkers in foods and beverages)

IT **9003-99-0, Peroxidase 9059-11-4, Amine oxidase 25232-42-2D**, Poly(1-**vinylimidazole**), complexes with **Os**(4,4'-**dimethyl-bipyridine**)+/2+ and **poly**(**ethylene glycol**) **diglycidyl-ether**
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(**biosensor** for detn. of freshness biomarkers in foods and beverages)

IT **7440-05-3, Palladium**, uses **7440-06-4, Platinum**, uses **7440-22-4, Silver**, uses **7440-44-0, Carbon**, uses **7440-57-5, Gold**, uses **7782-42-5, Graphite**, uses
RL: DEV (Device component use); USES (Uses)
(**biosensor** for detn. of freshness biomarkers in foods and beverages)

IT **9003-99-0, Peroxidase 9059-11-4, Amine oxidase 25232-42-2D**, Poly(1-**vinylimidazole**), complexes with **Os**(4,4'-**dimethyl-bipyridine**)+/2+ and **poly**(**ethylene glycol**) **diglycidyl-ether**
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(**biosensor** for detn. of freshness biomarkers in foods and beverages)

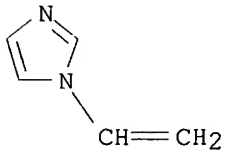
RN 9003-99-0 HCAPLUS
CN Peroxidase (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 9059-11-4 HCAPLUS
CN Oxidase, amine (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 25232-42-2 HCAPLUS
CN 1H-Imidazole, 1-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 1072-63-5
CMF C5 H6 N2



IT **7440-05-3, Palladium**, uses **7440-06-4, Platinum**, uses **7440-22-4, Silver**, uses **7440-44-0, Carbon**, uses **7440-57-5, Gold**, uses **7782-42-5, Graphite**, uses
RL: DEV (Device component use); USES (Uses)
(**biosensor** for detn. of freshness biomarkers in foods and beverages)
RN 7440-05-3 HCAPLUS
CN Palladium (8CI, 9CI) (CA INDEX NAME)

Pd

RN 7440-06-4 HCAPLUS
CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

RN 7440-22-4 HCAPLUS
CN Silver (8CI, 9CI) (CA INDEX NAME)

Ag

RN 7440-44-0 HCAPLUS
CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

RN 7440-57-5 HCAPLUS
CN Gold (8CI, 9CI) (CA INDEX NAME)

Au

RN 7782-42-5 HCAPLUS
CN Graphite (8CI, 9CI) (CA INDEX NAME)

C

L77 ANSWER 11 OF 33 / HCAPLUS COPYRIGHT 2003 ACS
AN 2000:870552 HCAPLUS
DN 134:159625
TI **Biosensors** based on novel plant **peroxidases**: a comparative study
AU Gaspar, S.; Popescu, I. C.; Gazaryan, I. G.; Gerardo Bautista, A.; Sakharov, I. Y.; Mattiasson, B.; **Csoregi, E.**
CS Department of Biotechnology, Lund University, Lund, SE-22100, Swed.
SO Electrochimica Acta (2000), 46(2-3), 255-264
CODEN: ELCAAV; ISSN: 0013-4686
PB Elsevier Science Ltd.
DT Journal
LA English

CC 9-1 (Biochemical Methods)
Section cross-reference(s): 7

AB Amperometric **biosensors** for hydrogen peroxide detection have been constructed using **horseradish peroxidase** (HRP) and two newly purified **peroxidases** extd. from **tobacco** (TOP) and **sweet potato** (SPP). The **peroxidases** were cross-linked to a **redox polymer** [poly(**vinylimidazole**) complexed with **Os**(4,4'dimethylbipyridine)2Cl2] using **poly(ethylene glycol) diglycidyl ether** as the crosslinker. A comparative study with regard to their bioelectrochem. characteristics showed that, irresp. of **peroxidase**, the **biosensors** sensitivity was strongly influenced by **hydrogel** compn., curing procedure, film thickness and applied potential. The electrostatic interaction between the cationic **redox polymer** and the neg. charged **peroxidases** (TOP and SPP) enhanced the hydrogen peroxide signal. When operated in a FI system, the optimized SPP **biosensor** (48% **redox polymer**, 23% cross-linker and 29% enzyme, wt./wt. %) displayed the highest sensitivity for H2O2 (3.2 A M-1cm-2), a linear range up to 220 .mu.M, a detection limit of 25 nM (calcd. as 2S/N) and a response time of about 2 min.

ST **peroxidase osmium** redox **polymer** hydrogen peroxide detn

IT Enzyme electrodes
(amperometric; hydrogen peroxide detection using plant **peroxidases** coupled to **osmium** redox **polymer**)

IT Immobilization, biochemical
(enzyme; hydrogen peroxide detection using plant **peroxidases** coupled to **osmium** redox **polymer**)

IT Electron transfer
Enzyme kinetics
(hydrogen peroxide detection using plant **peroxidases** coupled to **osmium** redox **polymer**)

IT **Hydrogels**
(**redox**; hydrogen peroxide detection using plant **peroxidases** coupled to **osmium redox polymer**)

IT **9003-99-0, Peroxidase**
RL: ARG (Analytical reagent use); PEP (Physical, engineering or chemical process); ANST (Analytical study); PROC (Process); USES (Uses)
(**horseradish**; hydrogen peroxide detection using plant **peroxidases** coupled to **osmium** redox **polymer**)

IT 7722-84-1, Hydrogen peroxide, analysis
RL: ANT (Analyte); ANST (Analytical study)
(hydrogen peroxide detection using plant **peroxidases** coupled to **osmium** redox **polymer**)

IT 15320-22-6D, complexes with polyvinylimidazole and epoxy resins
25232-42-2D, Osmium bipyridine chloride epoxy resin complexes **26403-72-5D**, Polyethylene glycol diglycidyl ether, **Osmium** bipyridine chloride complexes contg. polyvinylimidazole
RL: ARU (Analytical role, unclassified); ANST (Analytical study)
(hydrogen peroxide detection using plant **peroxidases** coupled to **osmium** redox **polymer**)

RE.CNT 49 THERE ARE 49 CITED REFERENCES AVAILABLE FOR THIS RECORD

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IT **9003-99-0, Peroxidase**
RL: ARG (Analytical reagent use); PEP (Physical, engineering or chemical process); ANST (Analytical study); PROC (Process); USES (Uses)
(**horseradish**; hydrogen peroxide detection using plant **peroxidases** coupled to **osmium** redox **polymer**)

RN 9003-99-0 HCAPLUS
CN Peroxidase (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

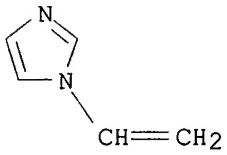
IT **25232-42-2D, Osmium** bipyridine chloride epoxy resin complexes **26403-72-5D**, Polyethylene glycol diglycidyl ether, **Osmium** bipyridine chloride complexes contg. polyvinylimidazole
RL: ARU (Analytical role, unclassified); ANST (Analytical study)
(hydrogen peroxide detection using plant **peroxidases** coupled to **osmium** redox **polymer**)

RN 25232-42-2 HCAPLUS

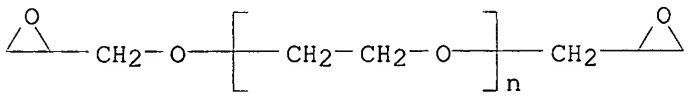
CN 1H-Imidazole, 1-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 1072-63-5
CMF C5 H6 N2



RN 26403-72-5 HCAPLUS
CN Poly(oxy-1,2-ethanediyl), .alpha.-(oxiranylmethyl)-.omega.-(oxiranylmethoxy)- (9CI) (CA INDEX NAME)



L77 ANSWER 12 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 2000:853721 HCAPLUS
DN 134:127954
TI **Biosensors** based on novel **peroxidases** with improved properties in direct and mediated electron transfer
AU Lindgren, A.; Ruzgas, T.; Gorton, L.; **Csoregi, E.**; Bautista Ardila, G.; Sakharov, I. Y.; Gazaryan, I. G.
CS Department of Analytical Chemistry, Lund University, Lund, SE-22100, Swed.
SO Biosensors & Bioelectronics (2000), 15(9-10), 491-497
CODEN: BBIOE4; ISSN: 0956-5663
PB Elsevier Science S.A.
DT Journal
LA English
CC 9-1 (Biochemical Methods)
Section cross-reference(s): 7
AB Native **horseradish peroxidase** (HRP) on **graphite** has revealed .apprxeq.50% of the active enzyme mols. to be in direct electron transfer (ET) contact with the electrode surface. Some novel plant **peroxidases** from **tobacco**, peanut and **sweet potato** were kinetically characterized on **graphite** in order to find promising candidates for **biosensor** applications and to understand the nature of the direct ET in the case of plant **peroxidases**. From measurements of the mediated and mediatorless currents of hydrogen peroxide redn. at the **peroxidase**-modified rotating disk electrodes (RDE), it was concluded that the fraction of enzyme mols. in direct ET varies substantially for the different plant **peroxidases**. It was obsd. that the anionic **peroxidases** (from **sweet potato** and **tobacco**) demonstrated a higher percentage of mols. in direct ET than the cationic ones (HRP and peanut **peroxidase**). The **peroxidases** with a high degree of glycosylation demonstrated a lower percentage of mols. in direct ET. It could, thus, be concluded that glycosylation of the **peroxidases** hinders direct ET and that a net neg. charge on the **peroxidase** (low pI value) is beneficial for direct ET. Esp. noticeable are the values obtained for **sweet potato peroxidase**

(SPP), revealing both a high percentage in direct ET and a high rate const. of direct ET. The **peroxidase** electrodes were used for detn. of hydrogen peroxide in RDE mode (mediatorless). SPP gave the lowest detection limit (40 nM) followed by HRP and peanut **peroxidase.**

ST **biosensor** electron transfer plant **peroxidase**

IT Enzyme kinetics
(of inhibition; plant **peroxidases** as alternatives to HRP in **peroxidase** based **biosensors**)

IT Electron transfer
Enzyme electrodes
(plant **peroxidases** as alternatives to HRP in **peroxidase** based **biosensors**)

IT **9003-99-0, Peroxidase**
RL: ARU (Analytical role, unclassified); PEP (Physical, engineering or chemical process); ANST (Analytical study); PROC (Process)
(plant; plant **peroxidases** as alternatives to HRP in **peroxidase** based **biosensors**)

RE.CNT 29 THERE ARE 29 CITED REFERENCES AVAILABLE FOR THIS RECORD

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IT **9003-99-0, Peroxidase**
RL: ARU (Analytical role, unclassified); PEP (Physical, engineering or chemical process); ANST (Analytical study); PROC (Process)
(plant; plant **peroxidases** as alternatives to HRP in **peroxidase** based **biosensors**)

RN 9003-99-0 HCAPLUS
CN Peroxidase (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L77 ANSWER 13 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 2000:805378 HCAPLUS
DN 134:97280
TI Electrooxidation Mechanism of Biogenic Amines at **Amine**

Oxidase Modified **Graphite Electrode**

AU **Niculescu, Mihaela**; Ruzgas, Tautgirdas; Nistor, Catalin; **Frebort, Ivo**; Sebela, Marek; Pec, Pavel; Csoeregi, Elisabeth
CS Department of Biotechnology, Lund University, Lund, S-22100, Swed.

SO Analytical Chemistry (2000), 72(24), 5988-5993
CODEN: ANCHAM; ISSN: 0003-2700
PB American Chemical Society
DT Journal
LA English
CC 9-1 (Biochemical Methods)
Section cross-reference(s): 7, 72

AB **Amine oxidase** (AO, EC. 1.4.3.6) was previously shown to be a very efficient biol. recognition element of amperometric **biosensors** for monitoring biogenic amines. The enzyme was effectively working in both mono- and bienzyme **electrode** designs, based on either a direct or a mediated electron-transfer pathway. This work focuses on the elucidation of the electron-transfer mechanism of the monoenzymic unmediated AO-modified **biosensor**. The obsd. unmediated catalytic currents were assumed to be caused by (i) a direct electron-transfer process, (ii) the electrooxidn. of the formed product, or (iii) their combination. Expts. supporting these assumptions are discussed in detail.

ST electrooxidn mechanism biogenic **amine oxidase** **graphite electrode**

IT Amines, analysis
RL: ANT (Analyte); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent)
(biogenic; electrooxidn. mechanism of biogenic amines at **amine oxidase** modified **graphite electrode**)

IT **Biosensors**
Chronoamperometry
Electrode reaction kinetics
Electron transfer
Enzyme **electrodes**
Enzyme kinetics
Oxidation, electrochemical
(electrooxidn. mechanism of biogenic amines at **amine oxidase** modified **graphite electrode**)

IT 147-84-2, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(**copper** complexation agent; electrooxidn. mechanism of biogenic amines at **amine oxidase** modified **graphite electrode**)

IT 56-17-7, Cystamine dihydrochloride 56-92-8, Histamine dihydrochloride 60-19-5, Tyramine hydrochloride 333-93-7, Putrescine dihydrochloride 1476-39-7, Cadaverine dihydrochloride 2482-00-0, Agmatine sulfate 49721-50-8, Spermidine phosphate
RL: ANT (Analyte); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent)
(electrooxidn. mechanism of biogenic amines at **amine oxidase** modified **graphite electrode**)

IT **9003-99-0, Peroxidase**
RL: ARG (Analytical reagent use); CAT (Catalyst use); DEV (Device component use); ANST (Analytical study); USES (Uses)
(electrooxidn. mechanism of biogenic amines at **amine oxidase** modified **graphite electrode**)

IT **9059-11-4, Amine oxidase**
RL: ARG (Analytical reagent use); CAT (Catalyst use); DEV (Device component use); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent); USES (Uses)
(electrooxidn. mechanism of biogenic amines at **amine oxidase** modified **graphite electrode**)

IT **9059-11-4DP, Amine oxidase, copper**

-free
RL: ARG (Analytical reagent use); CAT (Catalyst use); DEV (Device component use); SPN (Synthetic preparation); ANST (Analytical study); PREP (Preparation); USES (Uses)
(electrooxidn. mechanism of biogenic amines at **amine oxidase** modified **graphite electrode**)
IT **7782-42-5, Graphite**, uses
RL: DEV (Device component use); USES (Uses)
(electrooxidn. mechanism of biogenic amines at **amine oxidase** modified **graphite electrode**)
IT **7440-50-8, Copper**, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(electrooxidn. mechanism of biogenic amines at **amine oxidase** modified **graphite electrode**)
RE.CNT 40 THERE ARE 40 CITED REFERENCES AVAILABLE FOR THIS RECORD
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(40) Yaropolov, A; Bioelectrochem Bioenerg 1996, V40, P49 HCAPLUS
IT **9003-99-0, Peroxidase**
RL: ARG (Analytical reagent use); CAT (Catalyst use); DEV (Device component use); ANST (Analytical study); USES (Uses)
(electrooxidn. mechanism of biogenic amines at **amine oxidase** modified **graphite electrode**)
RN 9003-99-0 HCAPLUS

CN Peroxidase (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **9059-11-4, Amine oxidase**
RL: ARG (Analytical reagent use); CAT (Catalyst use); DEV (Device component use); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent); USES (Uses)
(electrooxidn. mechanism of biogenic amines at **amine oxidase** modified **graphite electrode**)
RN 9059-11-4 HCAPLUS
CN Oxidase, amine (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **9059-11-4DP, Amine oxidase, copper**
-free
RL: ARG (Analytical reagent use); CAT (Catalyst use); DEV (Device component use); SPN (Synthetic preparation); ANST (Analytical study); PREP (Preparation); USES (Uses)
(electrooxidn. mechanism of biogenic amines at **amine oxidase** modified **graphite electrode**)
RN 9059-11-4 HCAPLUS
CN Oxidase, amine (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **7782-42-5, Graphite**, uses
RL: DEV (Device component use); USES (Uses)
(electrooxidn. mechanism of biogenic amines at **amine oxidase** modified **graphite electrode**)
RN 7782-42-5 HCAPLUS
CN Graphite (8CI, 9CI) (CA INDEX NAME)

C

IT **7440-50-8, Copper**, reactions
RL: RCT (Reactant); RACT (Reactant or reagent)
(electrooxidn. mechanism of biogenic amines at **amine oxidase** modified **graphite electrode**)
RN 7440-50-8 HCAPLUS
CN Copper (7CI, 8CI, 9CI) (CA INDEX NAME)

Cu

L77 ANSWER 14 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 2000:749032 HCAPLUS
DN 133:307286
TI **Biosensor** using plasma-**polymerized** membrane
IN Muguruma, Hitoshi; Hiratsuka, Akinori; Karube, Masao
PA Sentan Kagaku Gijutsu Incubation Center K. K., Japan
SO Jpn. Kokai Tokkyo Koho, 11 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM G01N027-327
CC 9-1 (Biochemical Methods)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2000298111	A2	20001024	JP 1999-107691	19990415

WO 2000063685 A1 20001026 WO 2000-JP2417 20000413
W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM
RW: GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG
EP 1182450 A1 20020227 EP 2000-915512 20000413
R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO
PRAI JP 1999-107691 A 19990415
WO 2000-JP2417 W 20000413

AB A highly functional **biosensor** with a novel structure is conveniently constructed using a plasma-**polymd**. membrane. The **biosensor** is constituted with a plasma-**polymd**. membrane contg. functional groups, a catalytically active substance (e.g., enzyme) immobilized on the plasma-**polymd**. membrane using a crosslinking reagent, and a metal **electrode** pattern in contact with a sample through the plasma-**polymd**. membrane. The influence by interfering compds. is eliminated due to the hydrogen peroxide-selective permeability of the membrane. The **sensor** can be applied in a wide range of areas in combination with micromachine technique. A diagram describing the **sensor** assembly is given.

ST **biosensor** plasma **polymn** membrane enzyme **electrode**

IT Amide group
Amino group
Carbonyl group
Carboxyl group
Crosslinking agents
Enzyme **electrodes**
Epoxy group
Formyl group
Functional groups
Glucose **sensors**
Hydroxyl group
Immobilization, biochemical
Membrane **electrodes**
Membranes, nonbiological
Micromachines
Permeability
Sulfhydryl group
(**biosensor** using plasma-**polymd**. membrane)

IT Enzymes, uses
RL: ARG (Analytical reagent use); DEV (Device component use); PEP (Physical, engineering or chemical process); ANST (Analytical study); PROC (Process); USES (Uses)
(**biosensor** using plasma-**polymd**. membrane)

IT Metals, uses
RL: DEV (Device component use); USES (Uses)
(**biosensor** using plasma-**polymd**. membrane)

IT Halogens
RL: NUU (Other use, unclassified); USES (Uses)
(**biosensor** using plasma-**polymd**. membrane)

IT Monomers
RL: NUU (Other use, unclassified); USES (Uses)
(**biosensor** using plasma-**polymd**. membrane)

IT Noble gases, uses
RL: NUU (Other use, unclassified); USES (Uses)
(**biosensor** using plasma-**polymd**. membrane)

IT **Sensors**
(electrochem.; **biosensor** using plasma-**polymd.** membrane)
IT Functional groups
(imino group; **biosensor** using plasma-**polymd.** membrane)
IT Functional groups
(isocyanato group; **biosensor** using plasma-**polymd.** membrane)
IT **Polymerization**
(plasma; **biosensor** using plasma-**polymd.** membrane)
IT Functional groups
(vinyl group; **biosensor** using plasma-**polymd.** membrane)
IT 7722-84-1, Hydrogen peroxide, analysis
RL: ANT (Analyte); PEP (Physical, engineering or chemical process); ANST (Analytical study); PROC (Process)
(**biosensor** using plasma-**polymd.** membrane)
IT 9000-88-8, D-Amino acid **oxidase** 9000-89-9, L-Amino acid **oxidase** 9001-37-0, Glucose **oxidase** 9001-46-1, Glutamate dehydrogenase 9001-96-1, Pyruvate **oxidase** 9028-14-2, Glycerol dehydrogenase 9028-53-9, Glucose dehydrogenase 9028-67-5, Choline **oxidase** 9028-76-6, Cholesterol **oxidase** 9028-79-9, Galactose **oxidase** 9028-86-8, Aldehyde dehydrogenase 9031-72-5, Alcohol dehydrogenase 9035-73-8, **Oxidase** 9035-82-9, Dehydrogenase **9059-11-4**, **Amine oxidase** 67775-34-2, Cholesterol dehydrogenase 135622-84-3, Fructose dehydrogenase 220983-94-8, Sorbitol dehydrogenase
RL: ARG (Analytical reagent use); DEV (Device component use); PEP (Physical, engineering or chemical process); ANST (Analytical study); PROC (Process); USES (Uses)
(**biosensor** using plasma-**polymd.** membrane)
IT 50-81-7, Ascorbic acid, analysis 51-61-6, Dopamine, analysis 57-13-6, Urea, analysis 103-90-2
RL: ARU (Analytical role, unclassified); ANST (Analytical study)
(**biosensor** using plasma-**polymd.** membrane)
IT **7440-06-4, Platinum**, uses
RL: DEV (Device component use); USES (Uses)
(**biosensor** using plasma-**polymd.** membrane)
IT 302-01-2, Hydrazine, uses 1333-74-0, Hydrogen, uses 7664-41-7, Ammonia, uses 7727-37-9, Nitrogen, uses 7732-18-5, Water, uses 7782-44-7, Oxygen, uses 7783-06-4, Hydrogen sulfide, uses 13465-07-1, Hydrogen disulfide
RL: NUU (Other use, unclassified); USES (Uses)
(**biosensor** using plasma-**polymd.** membrane)
IT 75-05-8, Acetonitrile, reactions 107-46-0, Hexamethyldisiloxane 111-30-8, Glutaraldehyde
RL: RCT (Reactant); RACT (Reactant or reagent)
(**biosensor** using plasma-**polymd.** membrane)
IT **9059-11-4, Amine oxidase**
RL: ARG (Analytical reagent use); DEV (Device component use); PEP (Physical, engineering or chemical process); ANST (Analytical study); PROC (Process); USES (Uses)
(**biosensor** using plasma-**polymd.** membrane)
RN 9059-11-4 HCAPLUS
CN Oxidase, amine (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **7440-06-4, Platinum**, uses
RL: DEV (Device component use); USES (Uses)
(**biosensor** using plasma-**polymd.** membrane)
RN 7440-06-4 HCAPLUS
CN Platinum (8CI, 9CI) (CA INDEX NAME)

Pt

L77 ANSWER 15 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 2000:550147 HCAPLUS
DN 133:349278
TI **Amine oxidase**-based flow **biosensor** for the assessment of fish freshness
AU **Frebort, Ivo**; Skoupa, Lenka; Pec, Pavel
CS Department of Biochemistry, Faculty of Science, Palacky University, Olomoue, 783 71, Czech Rep.
SO Food Control (2000), 11(1), 13-18
CODEN: FOOCEV; ISSN: 0956-7135
PB Elsevier Science Ltd.
DT Journal
LA English
CC 17-1 (Food and Feed Chemistry)
AB **Amine oxidases** (EC 1.4.3.6) from **grass pea** (Lathyrus sativus) seedlings and fungus Aspergillus niger were immobilized to construct flow enzyme reactors for amine assay with spectrophotometric detection of enzymically produced hydrogen peroxide by a **peroxidase**/guaiacol system. While immobilized **amine oxidase** from A niger showed poor storage stability, the L sativus enzyme-based system was found useful for assay of putrefactive amines (putrescine and histamine) as markers of fish meat decompn. The optimized **biosensor** with av. lifetime 20 days showed a linear response to the amt. of histamine in the range 70-90 nmol with the assay limit of 4.4 nmol and putrescine in the range 0.9-70 nmol with the assay limit of 0.5 nmol.
ST immobilized **amine oxidase** histamine analysis trout
IT Food analysis
Oncorhynchus mykiss
(**amine oxidase**-based flow **biosensor** for the assessment of fish freshness)
IT Enzymes, uses
RL: ARG (Analytical reagent use); CAT (Catalyst use); ANST (Analytical study); USES (Uses)
(immobilized; **amine oxidase**-based flow **biosensor** for the assessment of fish freshness)
IT 51-45-6, Histamine, analysis 110-60-1, Putrescine
RL: ANT (Analyte); ANST (Analytical study)
(**amine oxidase**-based flow **biosensor** for the assessment of fish freshness)
IT **9059-11-4, Amine oxidase**
RL: ARG (Analytical reagent use); CAT (Catalyst use); ANST (Analytical study); USES (Uses)
(**amine oxidase**-based flow **biosensor** for the assessment of fish freshness)
RE.CNT 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
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IT **9059-11-4, Amine oxidase**
RL: ARG (Analytical reagent use); CAT (Catalyst use); ANST (Analytical study); USES (Uses)
(**amine oxidase**-based flow **biosensor** for the assessment of fish freshness)
RN 9059-11-4 HCAPLUS
CN Oxidase, amine (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L77 ANSWER 16 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 2000:248465 HCAPLUS
DN 133:116862
TI **Amine oxidase** based amperometric **biosensors** for histamine detection
AU **Niculescu, Mihaela; Frebort, Ivo;** Pec, Pavel; Galuszka, Petr; Mattiasson, Bo; **Csoregi, Elisabeth**
CS Department of Biotechnology, Lund University, Lund, S-22100, Swed.
SO Electroanalysis (2000), 12(5), 369-375
CODEN: ELANEU; ISSN: 1040-0397
PB Wiley-VCH Verlag GmbH
DT Journal
LA English
CC 9-1 (Biochemical Methods)
AB This work reports on the development and optimization of amperometric **biosensors** based on the enzyme **amine oxidase** (AO) for the detection of histamine, a well-known biomarker for food freshness. **Biosensor** characteristics were evaluated in a flow injection (FI) anal. line, operated at +200 mV (vs. **Ag**/AgCl/0.1 M KCl). Two different **biosensor** designs were considered, one based on adsorbed AO on **graphite electrodes**, the detection being based on a direct electron transfer (DET) mechanism, whereas the second one based on an Osbipyridine modified redox **polymer** using a mediated electron transfer (MET) pathway. Both **electrode** designs were able to detect histamine in .mu.M range, however, the [**osmium**(4,4'-dimethylbipyridine)2Cl]+/2+ complexed with poly(1-**vinylimidazole**) (PVI13-dmeOs) based **electrodes** showed superior characteristics with regard to stability, selectivity and linear range. These **electrodes** were characterized by a detection limit of 2.2 .mu.M (calcd. as three times the signal-to-noise ratio), a sensitivity of 6.8 mA M-1 cm-2, a linear range of 10-200 .mu.M, and an operational stability of 20% response loss during 8 h of continuous operation at a sample throughput of 30 injections h-1.
ST **amine oxidase** amperometric **biosensor** histamine; enzyme **electrode** histamine detn
IT Enzyme **electrodes**
(amperometric, histamine-selective; **amine oxidase** -based amperometric **graphite electrodes** for histamine detection)
IT Chlorides, uses
RL: DEV (Device component use); USES (Uses)
(complexes with dimethylbipyridine, **osmium** and poly(1-

vinylimidazole); amine oxidase-based amperometric graphite electrodes for histamine detection)

IT 51-45-6, Histamine, analysis
RL: ANT (Analyte); ANST (Analytical study)
(amine oxidase-based amperometric graphite electrodes for histamine detection)

IT 9059-11-4D, Amine oxidase, immobilized
RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)
(amine oxidase-based amperometric graphite electrodes for histamine detection)

IT 1134-35-6D, 4,4'-Dimethyl-2,2'-bipyridine, complexes with osmium, chloride and poly(1-vinylimidazole) 7440-04-2D, Osmium, complexes with dimethylbipyridine, chloride and poly(1-vinylimidazole), uses 25232-42-2D, Poly(1-vinylimidazole), complexes with osmium, dimethylbipyridine and chloride
RL: DEV (Device component use); USES (Uses)
(amine oxidase-based amperometric graphite electrodes for histamine detection)

RE.CNT 43 THERE ARE 43 CITED REFERENCES AVAILABLE FOR THIS RECORD

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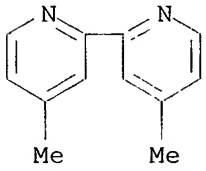
IT **9059-11-4D, Amine oxidase,** immobilized
RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)
(**amine oxidase**-based amperometric **graphite electrodes** for histamine detection)
RN 9059-11-4 HCAPLUS
CN Oxidase, amine (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

IT **1134-35-6D**, 4,4'-**Dimethyl**-2,2'-**bipyridine,** complexes with **osmium**, chloride and poly(1-**vinylimidazole**) **7440-04-2D, Osmium**, complexes with dimethylbipyridine, chloride and poly(1-**vinylimidazole**), uses **25232-42-2D**, Poly(1-**vinylimidazole**), complexes with **osmium**, dimethylbipyridine and chloride
RL: DEV (Device component use); USES (Uses)
(**amine oxidase**-based amperometric **graphite electrodes** for histamine detection)
RN 1134-35-6 HCAPLUS
CN 2,2'-Bipyridine, 4,4'-dimethyl- (9CI) (CA INDEX NAME)



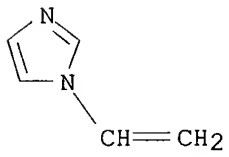
RN 7440-04-2 HCAPLUS
CN Osmium (8CI, 9CI) (CA INDEX NAME)

Os

RN 25232-42-2 HCAPLUS
CN 1H-Imidazole, 1-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 1072-63-5
CMF C5 H6 N2



L77 ANSWER 17 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 2000:145190 HCAPLUS
DN 132:292859
TI **Redox Hydrogel**-Based Amperometric Bienzyme

Electrodes for Fish Freshness Monitoring
AU **Niculescu, Mihaela**; Nistor, Catalin; **Frebort, Ivo**; Pec, Pavel; Mattiasson, Bo; Csoeregi, Elisabeth
CS Department of Biotechnology, Lund University, Lund, S-22100, Swed.
SO Analytical Chemistry (2000), 72(7), 1591-1597
CODEN: ANCHAM; ISSN: 0003-2700
PB American Chemical Society
DT Journal
LA English
CC 17-1 (Food and Feed Chemistry)
AB This work presents the design and optimization of amperometric **biosensors** for the detn. of biogenic amines (e.g., histamine, putrescine, cadaverine, tyramine, cystamine, agmatine, spermidine), commonly present in food products, and their application for monitoring of freshness in fish samples. The **biosensors** were used as the working **electrodes** of a three-**electrode** electrochem. cell of wall-jet type, operated at -50 mV vs. **Ag**/AgCl, in a flow injection system. Two different bienzyme **electrode** designs were considered, one based on the two enzymes [a newly isolated and purified **amine oxidase** (AO) and **horseradish peroxidase** (HRP)] simply adsorbed onto **graphite electrodes**, and one when they were cross-linked to an **Os** -based **redox polymer**. The **redox hydrogel**-based **biosensors** showed better **biosensors** characteristics, i.e., sensitivity of 0.194 A M-1 cm-2 for putrescine and 0.073 A M-1 cm-2 for histamine, and detection limits (calcd. as three times the signal-to-noise ratio) of 0.17 .mu.M for putrescine and 0.33 .mu.M for histamine. The optimized **redox hydrogel**-based **biosensors** were evaluated in terms of stability and selectivity, and were used for the detn. of total amine content in fish samples kept for 10 days in different conditions.
ST amperometric enzyme **electrode** amine detn fish; fish freshness monitoring amperometric **biosensor**
IT Food analysis
(amperometric bienzyme **electrodes** for detg. biogenic amines in)
IT Enzyme **electrodes**
(amperometric; **redox hydrogel**-based amperometric bienzyme **electrodes** for detg. biogenic amines in fish freshness monitoring)
IT Amines, analysis
RL: ANT (Analyte); ANST (Analytical study)
(biogenic; **redox hydrogel**-based amperometric bienzyme **electrodes** for detg. biogenic amines in fish freshness monitoring)
IT Fish
Hydrogels
(**redox hydrogel**-based amperometric bienzyme **electrodes** for detg. biogenic amines in fish freshness monitoring)
IT 51-45-6, Histamine, analysis 51-67-2, Tyramine 51-85-4, Cystamine 107-15-3, Ethylenediamine, analysis 110-60-1, Putrescine 124-20-9, Spermidine
RL: ANT (Analyte); ANST (Analytical study)
(**redox hydrogel**-based amperometric bienzyme **electrodes** for detg. biogenic amines in fish freshness monitoring)
IT **9003-99-0, Peroxidase 9059-11-4, Amine oxidase**
RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)
(**redox hydrogel**-based amperometric bienzyme **electrodes** for detg. biogenic amines in fish freshness

monitoring)
IT 9033-82-3D, complexes with **osmium** compd. 115304-16-0D, complexes with **vinylimidazole polymer**
RL: DEV (Device component use); USES (Uses)
(**redox hydrogel**-based amperometric bienzyme **electrodes** for detg. biogenic amines in fish freshness monitoring)
RE.CNT 45 THERE ARE 45 CITED REFERENCES AVAILABLE FOR THIS RECORD
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(45) Yen, G; J Food Sci 1991, V56, P158 HCAPLUS
IT **9003-99-0, Peroxidase 9059-11-4, Amine oxidase**
RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)
(**redox hydrogel**-based amperometric bienzyme **electrodes** for detg. biogenic amines in fish freshness monitoring)
RN 9003-99-0 HCAPLUS
CN Peroxidase (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
RN 9059-11-4 HCAPLUS
CN Oxidase, amine (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L77 ANSWER 18 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 2000:17220 HCAPLUS
DN 132:219076
TI Sensitive amperometric **biosensor** for the determination of biogenic and synthetic amines using **pea** seedlings **amine oxidase**: a novel approach for enzyme immobilisation
AU Wimmerova, M.; Macholan, L.
CS Department of Biochemistry, Faculty of Science, Masaryk University, Brno, 611 37, Czech Rep.
SO Biosensors & Bioelectronics (1999), 14(8-9), 695-702
CODEN: BBIOE4; ISSN: 0956-5663
PB Elsevier Science S.A.
DT Journal
LA English
CC 9-7 (Biochemical Methods)
AB We prepd. a new inorg. sorbent based on modified triazine (2-[4,6-bis (aminoethylamine)-1,3,5-triazine]-Silasorb; BAT-Silasorb) which binds **pea** seedlings **amine oxidase** (PSAO) very tightly without loss of its catalytic activity. This unique feature as well as the wide substrate specificity of PSAO was successfully utilized in the construction of an amperometric **biosensor** based on a **carbon paste electrode** for the fast and sensitive detection of various amines at a formal potential 0 mV vs. **Ag**/AgCl ref. **electrode**. The reaction layer of the **biosensor** is created by the direct immobilization of PSAO at the **electrode** surface via affinity carrier BAT-Silasorb. Used arrangement facilitates a simple restoration of the inactive **biosensor**. An amperometric signal results from **horseradish peroxidase** catalyzed redn. of H2O2, a secondary product of the oxidative deamination of amines, catalyzed by PSAO. The **sensor** was used for the basic characterization of 55 biogenic and synthetic amines, from numerous mono-, di- and polyamines to various hydroxy-, thio-, benzyl- and arom. derivs. in order to establish its suitability as a postcolumn detector. Its high sensitivity to putrescine 20.0.+-.0.64 mA l-1 per mol (636.9.+-.2.03 mA l-1 per mol per cm2), a limit of detection of 10 nmol l-1 (detd. with respect to a signal-to-noise ratio 3:1), a linear range of current response to 0.01-100 .mu.mol l-1 concn. of substrate and good reproducibility all indicate that the **sensor** could be applied to future industrial and clin. analyses.
ST **biosensor** amine detn; **electrode** enzyme **amino oxidase** amine detn; immobilization **amino oxidase electrode**
IT Amines, analysis
Amino acids, analysis
RL: ANT (Analyte); ANST (Analytical study)
(amperometric **carbon paste electrode** for detn. of biogenic and synthetic amines using immobilized **amine oxidase**)
IT Enzyme **electrodes**
(amperometric, immobilized **amine oxidase**; amperometric **carbon paste electrode** for detn. of biogenic and synthetic amines using immobilized **amine oxidase**)
IT Monoamines
RL: ANT (Analyte); ANST (Analytical study)

(biogenic, thiomonoamines and hydroxymonoamines; amperometric **carbon paste electrode** for detn. of biogenic and synthetic amines using **pea** seedlings **amine oxidase**)

IT **Paste electrodes**
(**carbon**; amperometric **carbon paste electrode** for detn. of biogenic and synthetic amines using immobilized **amine oxidase**)

IT Silica gel, analysis
RL: ARU (Analytical role, unclassified); DEV (Device component use); SPN (Synthetic preparation); ANST (Analytical study); PREP (Preparation); USES (Uses)
(conjugate with triazine deriv.; amperometric **carbon paste electrode** for detn. of biogenic and synthetic amines using **pea** seedlings **amine oxidase**)

IT Amines, analysis
RL: ANT (Analyte); ANST (Analytical study)
(diamines; amperometric **carbon paste electrode** for detn. of biogenic and synthetic amines using **pea** seedlings **amine oxidase**)

IT Immobilization, biochemical
(enzyme; amperometric **carbon paste electrode** for detn. of biogenic and synthetic amines using **pea** seedlings **amine oxidase**)

IT Amines, analysis
RL: ANT (Analyte); ANST (Analytical study)
(polyamines, **nonpolymeric**; amperometric **carbon paste electrode** for detn. of biogenic and synthetic amines using **pea** seedlings **amine oxidase**)

IT 51-45-6, Histamine, analysis 51-67-2, Tyramine 64-04-0, Benzeneethanamine 100-46-9, Benzylamine, analysis 120-20-7, Homoveratrylamine
RL: ANT (Analyte); ANST (Analytical study)
(amperometric **carbon paste electrode** for detn. of biogenic and synthetic amines using immobilized **amine oxidase**)

IT 7722-84-1, Hydrogen peroxide, analysis
RL: ANT (Analyte); ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(amperometric **carbon paste electrode** for detn. of biogenic and synthetic amines using immobilized **amine oxidase**)

IT 51-85-4, Cystamine 56-87-1, L-Lysine, analysis 60-23-1, Cysteamine 70-47-3, L-Asparagine, analysis 70-54-2, Lysine 71-44-3, Spermine 74-89-5, Methylamine, analysis 75-31-0, Isopropylamine, analysis 78-81-9, Isobutylamine 96-20-8, 2-Amino-1-butanol 104-84-7, p-Methylbenzylamine 107-10-8, 1-Aminopropane, analysis 107-85-7, Isoamylamine 110-58-7, 1-Aminopentane 110-60-1, 1,4-Diaminobutane 111-26-2, 1-Aminohexane 111-68-2, 1-Aminoheptane 111-86-4, 1-Aminooctane 124-09-4, 1,6-Diaminohexane, analysis 124-20-9, Spermidine 156-87-6, 3-Amino-1-propanol 459-73-4, Glycine ethyl ester 462-94-2, Cadaverine 539-48-0, p-Xylylenediamine 539-59-3, 2-Hydroxyputrescine 540-27-2 590-88-5, 1,3-Diaminobutane 616-29-5, 2-Hydroxy-1,3-diaminopropane 1477-55-0, m-Xylylenediamine 1904-78-5, o-Nitrobenzylamine 4048-33-3, 6-Amino-1-hexanol 4117-33-3, L-Lysine ethyl ester 4403-69-4, o-Aminobenzylamine 4403-70-7 4403-71-8, p-Aminobenzylamine 7409-18-9 7409-30-5, p-Nitrobenzylamine 17061-62-0 17300-02-6, o-Xylylenediamine 19293-58-4, p-Dimethylaminobenzylamine 24177-21-7 32798-38-2 38595-00-5, 3-Hydroxycadaverine 40930-37-8 128505-66-8
RL: ANT (Analyte); PRP (Properties); ANST (Analytical study)
(amperometric **carbon paste electrode** for detn. of biogenic and synthetic amines using immobilized **amine**

oxidase)
IT 107-15-3, 1,2-Diaminoethane, analysis
RL: ANT (Analyte); PRP (Properties); RCT (Reactant); ANST (Analytical study); RACT (Reactant or reagent)
(amperometric **carbon paste electrode** for detn. of biogenic and synthetic amines using immobilized **amine oxidase**)
IT **9003-99-0, Peroxidase**
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(amperometric **carbon paste electrode** for detn. of biogenic and synthetic amines using immobilized **amine oxidase**)
IT **9059-11-4, Amine oxidase**
RL: ARG (Analytical reagent use); DEV (Device component use); PEP (Physical, engineering or chemical process); ANST (Analytical study); PROC (Process); USES (Uses)
(amperometric **carbon paste electrode** for detn. of biogenic and synthetic amines using immobilized **amine oxidase**)
IT 103658-99-7DP, conjugate with Silasorb
RL: ARU (Analytical role, unclassified); DEV (Device component use); SPN (Synthetic preparation); ANST (Analytical study); PREP (Preparation); USES (Uses)
(amperometric **carbon paste electrode** for detn. of biogenic and synthetic amines using **pea** seedlings **amine oxidase**)
IT 108-77-0, Cyanuric chloride 162164-08-1, Silasorb-Amine
RL: RCT (Reactant); RACT (Reactant or reagent)
(amperometric **carbon paste electrode** for detn. of biogenic and synthetic amines using **pea** seedlings **amine oxidase**)
RE.CNT 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD
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IT **9003-99-0, Peroxidase**
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(amperometric **carbon paste electrode** for detn. of biogenic and synthetic amines using immobilized **amine oxidase**)
RN 9003-99-0 HCAPLUS
CN Peroxidase (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **9059-11-4, Amine oxidase**
RL: ARG (Analytical reagent use); DEV (Device component use); PEP (Physical, engineering or chemical process); ANST (Analytical study); PROC (Process); USES (Uses)
(amperometric **carbon paste electrode** for detn. of biogenic and synthetic amines using immobilized **amine oxidase**)
RN 9059-11-4 HCAPLUS
CN Oxidase, amine (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L77 ANSWER 19 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 1998:581464 HCAPLUS
DN 129:270721
TI Design and development of an amperometric **biosensor** for acetylcholine determination in brain microdialyzates
AU Larsson, N.; Ruzgas, T.; Gorton, L.; Kokaia, M.; Kissinger, P.; **Csoregi, E.**
CS Dep. Anal. Chem., Lund Univ., Lund, SE-221 00, Swed.
SO Electrochimica Acta (1998), 43(23), 3541-3554
CODEN: ELCAAV; ISSN: 0013-4686
PB Elsevier Science Ltd.
DT Journal
LA English
CC 2-1 (Mammalian Hormones)
AB An amperometric three-enzyme based **biosensor** for detn. of acetylcholine has been developed with possible use for monitoring of brain microdialyzates by co-immobilizing acetylcholinesterase (AchE), choline **oxidase** (ChOx) and **horseradish peroxidase** (HRP) in an **Os**-based **redox polymer** on solid **graphite** electrodes. The **redox hydrogel** was formed by crosslinking the appropriate enzymes and the **Os**-**polymer** (PVI13-dmeOs) working as a non-diffusing mediator between the electrode and HRP. The sensor was used in a flow injection system at an applied potential of -50 mV vs. **Ag**/AgCl. A detection limit of 0.3 .mu.M (twice the S/N ratio) for acetylcholine was obtained, thus representing a sensitive detection system. By adapting the electrode into a microsystem, the release of acetylcholine in real samples (rat brain dialyzates) could be shown. Electrode design, optimization steps and characteristics for the optimized electrode configuration are presented.
ST amperometric **biosensor** acetylcholine brain microdialyzate
IT **Biosensors**
(**amperometric**; design and development of **amperometric biosensor** for acetylcholine detn. in brain microdialyzates)
IT Brain
Electrodes
Flow injection systems
(design and development of amperometric **biosensor** for acetylcholine detn. in brain microdialyzates)
IT **Hydrogels**
(**redox**; design and development of amperometric **biosensor** for acetylcholine detn. in brain microdialyzates)
IT 51-84-3, Acetylcholine, analysis
RL: ANT (Analyte); ANST (Analytical study)
(design and development of amperometric **biosensor** for acetylcholine detn. in brain microdialyzates)
IT 9000-81-1, Acetylcholinesterase 9028-67-5, Choline **oxidase**
RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)
(design and development of amperometric **biosensor** for acetylcholine detn. in brain microdialyzates)

IT **7440-04-2, Osmium**, uses
RL: DEV (Device component use); USES (Uses)
(design and development of amperometric **biosensor** for acetylcholine detn. in brain microdialyzates)
IT **9003-99-0, Peroxidase**
RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)
(**horseradish**; design and development of amperometric **biosensor** for acetylcholine detn. in brain microdialyzates)
RE.CNT 44 THERE ARE 44 CITED REFERENCES AVAILABLE FOR THIS RECORD
RE
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(32) Ohara, T; Anal Chem 1994, V66, P2451 HCAPLUS
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(38) Ruzgas, T; J Electroanal Chem 1995, V391, P41 HCAPLUS
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(40) Stryer, L; Biochemistry 1981
(41) Tessema, M; Anal Chem 1997, V69, P4039 HCAPLUS
(42) Tessema, M; Anal Chim Acta 1997, V349, P179 HCAPLUS
(43) Vijayakumar, A; Anal Chim Acta 1996, V327, P223 HCAPLUS
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IT **7440-04-2, Osmium**, uses
RL: DEV (Device component use); USES (Uses)
(design and development of amperometric **biosensor** for acetylcholine detn. in brain microdialyzates)
RN 7440-04-2 HCAPLUS
CN Osmium (8CI, 9CI) (CA INDEX NAME)

Os

IT **9003-99-0, Peroxidase**
RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)
(**horseradish**; design and development of amperometric **biosensor** for acetylcholine detn. in brain microdialyzates)
RN 9003-99-0 HCAPLUS
CN Peroxidase (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L77 ANSWER 20 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 1998:374690 HCAPLUS
DN 129:158698
TI Enzyme **biosensors** based on electron transfer between electrode and immobilized **peroxidases**
AU Gorton, Lo; **Csoregi, Elisabeth**; Ruzgas, Tautgirdas; Gazaryan, Irina; Marko-Varga, Gyorgy
CS Department of Analytical Chemistry, Chemical Center, Lund University, Lund, Swed.
SO Methods in Biotechnology (1998), 6(Enzyme and Microbial Biosensors), 93-120
CODEN: MEBIFQ
PB Humana Press Inc.
DT Journal
LA English
CC 9-7 (Biochemical Methods)
AB The principle and construction of the title electrode are discussed.
ST enzyme **biosensor** electrode immobilized **peroxidase**
IT Electron transfer
Enzyme electrodes
(enzyme **biosensors** based on electron transfer between electrode and immobilized **peroxidases**)
IT **9003-99-0, Peroxidase**
RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)
(enzyme **biosensors** based on electron transfer between electrode and immobilized **peroxidases**)
IT **9003-99-0, Peroxidase**
RL: ARG (Analytical reagent use); DEV (Device component use); ANST (Analytical study); USES (Uses)
(enzyme **biosensors** based on electron transfer between electrode and immobilized **peroxidases**)
RN 9003-99-0 HCAPLUS
CN Peroxidase (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L77 ANSWER 21 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 1998:86392 HCAPLUS
DN 128:241488
TI The main factors of monoamine **biosensor** selectivity increasing
AU Yagodina, Olga V.; Nikolskaya, Elena B.
CS Sechenov Institute of Evolutionary Physiology and Biochemistry, Russian Academy of Sciences, St. Petersburg, 194223, Russia
SO Sensors and Actuators, B: Chemical (1997), B44(1-3), 566-570
CODEN: SABCEB; ISSN: 0925-4005
PB Elsevier Science S.A.
DT Journal
LA English

CC 9-16 (Biochemical Methods)
Section cross-reference(s): 7
AB The influence of the main factors of **biosensor** selectivity on monoamine detn. have been studied. In the compn. of new **biosensors**, **amine oxidases** (AO) from different sources were used: mitochondrial AO from pig and rat liver and AO from Methanosarcina barkeri strain 27. Enzyme prepns. of different degrees of purifn. and immobilized in different ways have been studied. Potentiometric **electrodes**, gas-sensing **electrodes**, and colorimetric **sensors** were used as the anal. detectors in the designed **biosensors**. New methods for the individual detn. of monoamines and for the detection of their sum in the sample have been worked out.
ST monoamine **biosensor** selectivity **amine oxidase** **electrode**
IT Enzyme **electrodes**
(gas-sensing; main factors increasing monoamine **biosensor** selectivity)
IT **Biosensors**
(main factors increasing monoamine **biosensor** selectivity)
IT Monoamines
RL: ANT (Analyte); BPR (Biological process); BSU (Biological study, unclassified); ANST (Analytical study); BIOL (Biological study); PROC (Process)
(main factors increasing monoamine **biosensor** selectivity)
IT Enzyme **electrodes**
(potentiometric; main factors increasing monoamine **biosensor** selectivity)
IT Immobilization, biochemical
(protein, **amine oxidase**; main factors increasing monoamine **biosensor** selectivity)
IT Gelatins, uses
RL: NUU (Other use, unclassified); USES (Uses)
(use in **amine oxidase** immobilization; main factors increasing monoamine **biosensor** selectivity)
IT 50-67-9, Serotonin, analysis 51-67-2, Tyramine 100-46-9, Benzylamine, analysis
RL: ANT (Analyte); BPR (Biological process); BSU (Biological study, unclassified); ANST (Analytical study); BIOL (Biological study); PROC (Process)
(main factors increasing monoamine **biosensor** selectivity)
IT **9059-11-4D, Amine oxidase**, immobilized
RL: ARG (Analytical reagent use); BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); ANST (Analytical study); BIOL (Biological study); USES (Uses)
(main factors increasing monoamine **biosensor** selectivity)
IT 9002-18-0D, Agar, **amine oxidase** conjugate
RL: NUU (Other use, unclassified); USES (Uses)
(use in **amine oxidase** immobilization; main factors increasing monoamine **biosensor** selectivity)
IT **9059-11-4D, Amine oxidase**, immobilized
RL: ARG (Analytical reagent use); BAC (Biological activity or effector, except adverse); BSU (Biological study, unclassified); ANST (Analytical study); BIOL (Biological study); USES (Uses)
(main factors increasing monoamine **biosensor** selectivity)
RN 9059-11-4 HCAPLUS
CN Oxidase, amine (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L77 ANSWER 22 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 1997:335388 HCAPLUS
DN 127:62727

TI Preliminary investigations of an amperometric oligosaccharide dehydrogenase-based electrode for the detection of glucose and some other low molecular weight saccharides
AU Ruzgas, T.; **Csoregi, E.**; Katakis, I.; Kenausis, G.; Gorton, L.
CS Enzyme Chem. Lab., Inst. Biochem., Vilnius, 26000, Lithuania
SO Journal of Molecular Recognition (1996), 9(5/6), 480-484
CODEN: JMORE4; ISSN: 0952-3499
PB Wiley
DT Journal
LA English
CC 9-7 (Biochemical Methods)
AB **Biosensors** for the detn. of sugars were constructed using oligosaccharide dehydrogenase (ODH) and sol. phenazine methosulfate (PMS) or an **osmium**-based three-dimensional **redox hydrogel**. In the latter case the enzyme and poly(1-**vinylimidazole**) complexed with **osmium** (4,4'-dimethylbpy)2Cl were cross-linked with **poly(ethylene glycol) diglycidyl ether**. Both electrode configurations showed similar sensitivities for glucose in the range between 8 and 21 .mu.AmM-1 cm-2. The responses for 10 mono and oligosaccharides were studied. There was no response for fructose. In the concn. range 0.1-2.0 mM the relative sensitivities were detd. for arabinose (96%), xylose (3%), mannose (50%), galactose (11%), glucose (100%), maltose (24%), lactose (12%), cellobiose (34%) and maltotriose (10%).
ST glucose saccharide detn oligosaccharide dehydrogenase electrode
IT Electrodes
(preliminary investigations of an amperometric oligosaccharide dehydrogenase-based electrode for the detection of glucose and some other low mol. wt. saccharides)
IT Carbohydrates, analysis
RL: ANT (Analyte); ANST (Analytical study)
(preliminary investigations of an amperometric oligosaccharide dehydrogenase-based electrode for the detection of glucose and some other low mol. wt. saccharides)
IT 50-99-7, Glucose, analysis 58-86-6, Xylose, analysis 59-23-4, Galactose, analysis 63-42-3, Lactose 69-79-4, Maltose 147-81-9, Arabinose 528-50-7, Cellobiose 1109-28-0, Maltotriose 3458-28-4, Mannose
RL: ANT (Analyte); ANST (Analytical study)
(preliminary investigations of an amperometric oligosaccharide dehydrogenase-based electrode for the detection of glucose and some other low mol. wt. saccharides)
IT 299-11-6, Phenazine methosulfate 122191-33-7, Oligosaccharide dehydrogenase
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(preliminary investigations of an amperometric oligosaccharide dehydrogenase-based electrode for the detection of glucose and some other low mol. wt. saccharides)

L77 ANSWER 23 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 1997:49634 HCAPLUS
TI Amperometric **biosensor** with immobilized **pea** seedlings **amine oxidase**
AU Wimmerova, Michaela; Macholan, Lumir
CS Dep. Biochem., Masaryk Univ., Brno, 611 37, Czech Rep.
SO Chem. Listy (1996), 90(9), 725
CODEN: CHLSAC; ISSN: 0009-2770
PB Ceska Spolecnost Chemicka
DT Journal
LA Czech
AB Unavailable

L77 ANSWER 24 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 1997:9160 HCAPLUS
DN 126:28836
TI Eznyme **electrode**
IN Karube, Masao; Nagata, Ryohei
PA Karube Masao, Japan; Dainippon Printing Co Ltd
SO Jpn. Kokai Tokkyo Koho, 16 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM G01N027-327
CC 9-7 (Biochemical Methods)
Section cross-reference(s): 72
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 08271472	A2	19961018	JP 1995-93171	19950328
PRAI	JP 1995-93171		19950328		

AB Disclosed is compn. comprising conductive enzyme, metal complex, nicotinamide deriv., flavin deriv. quinone or quinone deriv., hydrophilic and/or hydrophobic **polymer** for prepn. of enzyme **sensor** for anal. The enzyme **electrode** is useful for rapid detection of analyte in bio-sample.
ST enzyme **electrode** metal complex flavin nicotinamide
IT Metals, uses
RL: DEV (Device component use); USES (Uses)
(complex; enzyme **electrode** comprises conductive enzyme, metal complex, and nicotinamide deriv)
IT Enzymes, uses
RL: DEV (Device component use); USES (Uses)
(conductive; enzyme **electrode** comprises conductive enzyme, metal complex, and nicotinamide deriv)
IT Flavins
RL: DEV (Device component use); USES (Uses)
(deriv.; enzyme **electrode** comprises conductive enzyme, metal complex, and nicotinamide deriv)
IT Enzyme **electrodes**
(enzyme **electrode** comprises conductive enzyme, metal complex, and nicotinamide deriv)
IT Polyvinyl butyrals
Sandwich compounds
RL: DEV (Device component use); USES (Uses)
(enzyme **electrode** comprises conductive enzyme, metal complex, and nicotinamide deriv)
IT **Biosensors**
(**enzymic**; enzyme **electrode** comprises conductive enzyme, metal complex, and nicotinamide deriv)
IT **Polymers**, uses
RL: DEV (Device component use); USES (Uses)
(hydrophobic and/or hydrophilic; enzyme **electrode** comprises conductive enzyme, metal complex, and nicotinamide deriv)
IT 102-54-5, Ferrocene
RL: DEV (Device component use); USES (Uses)
(deriv.; enzyme **electrode** comprises conductive enzyme, metal complex, and nicotinamide deriv)
IT 98-92-0D, 3-Pyridinecarboxamide, deriv. 106-51-4D, 2,5-Cyclohexadiene-1,4-dione, deriv. 1071-93-8 4080-95-9 9000-88-8 9000-89-9 9001-37-0 9001-96-1 9003-39-8 9028-67-5 9028-76-6 9028-79-9 9035-73-8, **Oxidase 9059-11-4** 13043-98-6 14323-06-9 20247-84-1 23570-43-6 33037-04-6 34796-67-3 64616-77-9
RL: DEV (Device component use); USES (Uses)
(enzyme **electrode** comprises conductive enzyme, metal complex, and nicotinamide deriv)

IT **9059-11-4**
RL: DEV (Device component use); USES (Uses)
(enzyme **electrode** comprises conductive enzyme, metal complex, and nicotinamide deriv)
RN 9059-11-4 HCAPLUS
CN Oxidase, amine (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L77 ANSWER 25 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 1996:252397 HCAPLUS
DN 124:283713
TI Composition for enzyme **electrode**
IN Watanabe, Masayoshi
PA Dainippon Printing Co Ltd, Japan
SO Jpn. Kokai Tokkyo Koho, 7 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM G01N027-327
ICS C08F220-28; C08F230-04
CC 9-7 (Biochemical Methods)
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 08029372	A2	19960202	JP 1994-232508	19940902
PRAI JP 1994-117392		19940509		

AB Compn. contg. enzyme, **polymeric** mediator, conductive component, binder, etc. is disclosed for prepg. enzyme **biosensor** with wide detection spectrum, high sensitivity, and long-life. The mediator is a **homopolymer** or **copolymer** of redox-active monomer, e.g. derivs. of ferrocene, nicotinamide, flavin, quinone, etc. The enzyme is an **oxidase** or dehydrogenase; and the conductive component is a metal and/or **carbon** microparticle. In example, vinylferrocene-methoxynanoethylene oxide methacrylate **copolymer** was prepd. as mediator, mixed with glucose **oxidase**, and coated on **electrode** for glucose detn. Similarly, enzyme **electrode** contg. vinylferrocene-dodecyl methacrylate as mediator was also prepd. for the same purpose.
ST enzyme **electrode polymer copolymer** mediator
IT Enzyme **electrodes**
(compn. contg. enzyme and **polymeric** mediator and conductive component and binder, for enzyme **electrode**)
IT Enzymes
RL: DEV (Device component use); USES (Uses)
(compn. contg. enzyme and **polymeric** mediator and conductive component and binder, for enzyme **electrode**)
IT Metals
RL: DEV (Device component use); USES (Uses)
(conductive; compn. contg. enzyme and **polymeric** mediator and conductive component and binder, for enzyme **electrode**)
IT Flavins
RL: DEV (Device component use); USES (Uses)
(derivs.; **polymer** or **copolymer**; compn. contg. enzyme and **polymeric** mediator and conductive component and binder, for enzyme **electrode**)
IT **Biosensors**
(enzyme; compn. contg. enzyme and **polymeric** mediator and conductive component and binder, for enzyme **electrode**)
IT **Polymers**
RL: DEV (Device component use); USES (Uses)
(mediator; compn. contg. enzyme and **polymeric** mediator and conductive component and binder, for enzyme **electrode**)

IT **Polymers**
RL: DEV (Device component use); USES (Uses)
(co-, mediator; compn. contg. enzyme and **polymeric** mediator and conductive component and binder, for enzyme **electrode**)
IT 50-99-7, D-Glucose
RL: ANT (Analyte); ANST (Analytical study)
(compn. contg. enzyme and **polymeric** mediator and conductive component and binder, for enzyme **electrode**)
IT 75-01-4D, derivs.; **polymers** 75-35-4D, derivs.; **polymers** 78-79-5D, derivs.; **polymers** 79-10-7D, 2-Propenoic acid, derivs., **polymers** with ferrocenes 79-41-4D, derivs., **polymers** with ferrocenes 98-83-9D, derivs.; **polymers** 98-92-0D, 3-Pyridinecarboxamide, derivs.; **polymers** 100-42-5D, derivs.; **polymers** 102-54-5D, Ferrocene, derivs.; **polymers** 106-51-4D, 2,5-Cyclohexadiene-1,4-dione, derivs.; **polymers** 106-99-0D, 1,3-Butadiene, derivs.; **polymers** 108-05-4D, Acetic acid ethenyl ester, derivs.; **polymers** 115-11-7D, derivs.; **polymers** 9000-88-8 9000-89-9 9001-37-0 9001-96-1 9028-14-2 9028-21-1 9028-53-9 9028-67-5 9028-76-6 9028-79-9 9028-86-8 9031-72-5 9035-73-8, **Oxidase** 9035-82-9, Dehydrogenase **9059-11-4** 67775-34-2 135622-84-3 166274-80-2 175735-60-1
RL: DEV (Device component use); USES (Uses)
(compn. contg. enzyme and **polymeric** mediator and conductive component and binder, for enzyme **electrode**)
IT 74-85-1D, Ethene, derivs.; **polymers** 107-13-1D, 2-Propenenitrile, derivs.; **polymers** 9001-46-1
RL: DEV (Device component use); USES (Uses)
(compn. contg. enzyme and **polymeric** mediator and conductive component and binder,. for enzyme **electrode**)
IT **7440-44-0, Carbon**
RL: DEV (Device component use); USES (Uses)
(microparticles; compn. contg. enzyme and **polymeric** mediator and conductive component and binder, for enzyme **electrode**)
IT **9059-11-4**
RL: DEV (Device component use); USES (Uses)
(compn. contg. enzyme and **polymeric** mediator and conductive component and binder, for enzyme **electrode**)
RN 9059-11-4 HCAPLUS
CN Oxidase, amine (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **7440-44-0, Carbon**
RL: DEV (Device component use); USES (Uses)
(microparticles; compn. contg. enzyme and **polymeric** mediator and conductive component and binder, for enzyme **electrode**)
RN 7440-44-0 HCAPLUS
CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

L77 ANSWER 26 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 1995:777885 HCAPLUS
DN 123:164079
TI **Sensor electrode** containing immobilized enzymes and hydrophilic or hydrophilic resins
IN Karube, Masao; Nagata, Ryohei
PA Karube Masao, Japan; Dainippon Printing Co Ltd
SO Jpn. Kokai Tokkyo Koho, 15 pp.
CODEN: JKXXAF

DT Patent
LA Japanese
IC ICM G01N027-327
CC 7-7 (Enzymes)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 07151727	A2	19950616	JP 1994-257272	19940928
PRAI	JP 1993-264298		19930928		

AB A **sensor electrode** was constructed which contained hydrophilic resin (e.g. polyvinylpyrrolidone) or hydrophobic resin (e.g. polyvinylbutyral), an **oxidase** (e.g. glucose **oxidase**), and an enzyme mediator (e.g. ferrocene, nicotine amine, and quinone). Glucose concn. was detd. by the **sensor electrode** contg. glucose **oxidase**. Examples of other **oxidases** are galactose **oxidase**, pyruvate **oxidase**, D- and L-amino acid **oxidase**, **amine oxidase**, cholesterol **oxidase**, and choline **oxidase**.

ST **sensor electrode** immobilization resin enzyme

IT Flavins
RL: NUU (Other use, unclassified); USES (Uses)
(enzyme mediator; **sensor electrode** contg. immobilized enzymes and hydrophilic or hydrophilic resins)

IT Resins
RL: NUU (Other use, unclassified); USES (Uses)
(hydrophilic and hydrophobic; **sensor electrode** contg. immobilized enzymes and hydrophilic or hydrophilic resins)

IT Enzymes
RL: NUU (Other use, unclassified); USES (Uses)
(**sensor electrode** contg. immobilized enzymes and hydrophilic or hydrophilic resins)

IT Vinyl acetal **polymers**
RL: NUU (Other use, unclassified); USES (Uses)
(butyrals, **sensor electrode** contg. immobilized enzymes and hydrophilic or hydrophilic resins)

IT **Sensors**
(electrochem., **sensor electrode** contg. immobilized enzymes and hydrophilic or hydrophilic resins)

IT 50-99-7, Glucose, analysis
RL: ANT (Analyte); ANST (Analytical study)
(detn. of; **sensor electrode** contg. immobilized enzymes and hydrophilic or hydrophilic resins)

IT 98-92-0, 3-Pyridinecarboxamide 102-54-5, Ferrocene 106-51-4, Quinone, uses 1271-42-7, Ferrocene carboxylic acid
RL: NUU (Other use, unclassified); USES (Uses)
(enzyme mediator; **sensor electrode** contg. immobilized enzymes and hydrophilic or hydrophilic resins)

IT 9000-88-8, D-Amino acid **oxidase** 9000-89-9, L-Amino acid **oxidase** 9001-37-0, Glucose **oxidase** 9001-96-1, Pyruvate **oxidase** 9003-39-8, Polyvinylpyrrolidone 9028-67-5, Choline **oxidase** 9028-76-6, Cholesterol **oxidase** 9028-79-9, Galactose **oxidase** 9035-73-8, **Oxidase** **9059-11-4, Amine oxidase**
RL: NUU (Other use, unclassified); USES (Uses)
(**sensor electrode** contg. immobilized enzymes and hydrophilic or hydrophilic resins)

IT **9059-11-4, Amine oxidase**
RL: NUU (Other use, unclassified); USES (Uses)
(**sensor electrode** contg. immobilized enzymes and hydrophilic or hydrophilic resins)

RN 9059-11-4 HCAPLUS
CN Oxidase, amine (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L7 ANSWER 27 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 1994:577990 HCAPLUS
DN 121:177990
TI Oxygen-**sensor**-based simple assay of histamine in fish using purified **amine oxidase**
AU Ohashi, Minoru; Nomura, Fumiko; Suzuki, Mieko; Otsuka, Megumi; Adachi, Osao; Arakawa, Nobuhiko
CS Moritex Co., Tokyo, 150, Japan
SO Journal of Food Science (1994), 59(3), 519-22
CODEN: JFDSAZ; ISSN: 0022-1147
DT Journal
LA English
CC 17-1 (Food and Feed Chemistry)
AB Oxygen consumption was measured by an oxygen **sensor** after addn. of purified fungal **amine oxidase** to fish exts. The oxidn. of histamine to imidazole acetaldehyde proceeded stoichiometrically. Based on the equimolar relationship between histamine and oxygen consumption, histamine was detd. selectively by the oxygen **sensor**. Neither sample pretreatment removing interfering materials nor daily calibration by histamine std. was required. Histamine contents in scombroid fish were detd. rapidly with good accuracy. AOAC and oxygen **sensor** methods showed a very high correlation ($r = 0.999$, $n = 6$).
ST histamine detn fish oxygen **biosensor**; **amine oxidase** histamine assay
IT **Biosensors**
(for oxygen, histamine detn. in fish with, **amine oxidase** in)
IT Fish
Mackerel
Trachurus
Tuna
(histamine detn. in, by **biosensor** for oxygen, **amine oxidase** in)
IT Tuna
(canned, histamine detn. in, by **biosensor** for oxygen, **amine oxidase** in)
IT Euthynnus affinis
(frozen, histamine detn. in, by **biosensor** for oxygen, **amine oxidase** in)
IT Canned foods
Frozen foods
(tuna, histamine detn. in, by **biosensor** for oxygen, **amine oxidase** in)
IT 7782-44-7, Oxygen, miscellaneous
RL: MSC (Miscellaneous)
(**biosensor** for, histamine detn. in fish with, **amine oxidase** in)
IT 51-45-6, Histamine, analysis
RL: ANT (Analyte); ANST (Analytical study)
(detn. of, in fish by **biosensor** for oxygen, **amine oxidase** in)
IT **9059-11-4, Amine oxidase**
RL: ANST (Analytical study)
(in histamine detn. in fish, by oxygen **biosensor**)
IT **9059-11-4, Amine oxidase**
RL: ANST (Analytical study)
(in histamine detn. in fish, by oxygen **biosensor**)
RN 9059-11-4 HCAPLUS
CN Oxidase, amine (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L77 ANSWER 28 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 1994:574216 HCAPLUS
DN 121:174216
TI Renewable miniature enzyme-based sensing devices
AU Gasparini, R.; Scarpa, M.; Vianello, F.; Mondovi, B.; Rigo, A.
CS Department of Biological Chemistry, University of Padova, Via Trieste 75, Padova, 35100, Italy
SO Analytica Chimica Acta (1994), 294(3), 299-304
CODEN: ACACAM; ISSN: 0003-2670
DT Journal
LA English
CC 9-1 (Biochemical Methods)
AB A new approach to the prepn. of electrochem. **biosensors**, based on a mixed Sepharose-**carbon paste electrode**, is described. The **bioelectrode** is made from **carbon paste** which is mixed, during prepn., with a mediator and with Sepharose contg. an immobilized enzyme. The immobilized enzymes were glucose **oxidase**, from Aspergillus niger, and **amine oxidase** from bovine serum and from **soybean** seedlings. The Sepharose environment, favorable to the enzyme, and the close proximity of the enzyme redox-mediating and sensing sites, permits the required amt. of enzyme to be decreased by two orders of magnitude and allows rapid response to the substrate. Response times as short as 15 s have been measured. The **microelectrodes** are easily fabricated, and the modified **carbon paste** can be incorporated in the various **sensor** configurations (micro, flow, etc.) relevant to clin. anal.
ST renewable miniature enzyme based sensing device
IT **Electrodes**
(bio-, renewable miniature enzyme-based sensing devices)
IT **Electrodes**
(bio-, glucose-selective, renewable miniature enzyme-based sensing devices)
IT 50-99-7, Glucose, analysis
RL: ANT (Analyte); ANST (Analytical study)
(renewable miniature enzyme-based sensing devices)
IT 9001-37-0D, Glucose **oxidase**, immobilized **9059-11-4D**, **Amine oxidase**, immobilized 58856-73-8, Ah sepharose
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(renewable miniature enzyme-based sensing devices)
IT **9059-11-4D**, **Amine oxidase**, immobilized
RL: ARG (Analytical reagent use); ANST (Analytical study); USES (Uses)
(renewable miniature enzyme-based sensing devices)
RN 9059-11-4 HCAPLUS
CN Oxidase, amine (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L77 ANSWER 29 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 1994:100871 HCAPLUS
DN 120:100871
TI A reagentless amperometric **biosensor** for alcohol detection in column liquid chromatography based on co-immobilized **peroxidase** and alcohol **oxidase** in **carbon paste**
AU Johansson, K.; Joensson-Pettersson, G.; Gorton, L.; Marko-Varga, G.; **Csoregi, E.**
CS Dep. Anal. Chem., Univ. Lund, Lund, S-221 00, Swed.
SO Journal of Biotechnology (1993), 31(3), 301-16
CODEN: JBITD4; ISSN: 0168-1656
DT Journal
LA English

CC 9-1 (Biochemical Methods)
Section cross-reference(s): 16, 72, 80
AB A reagentless **C paste** electrode chem. modified with covalently bound alc. **oxidase** and **horseradish peroxidase** was examd. as a selective sensor in flow injection and column liq. chromatog. A combination of carbodiimide, glutaraldehyde, and polyethylenimine was used for immobilizing the enzymes in the **paste**. The surface of the electrodes was protected by first forming a layer of **electropolymd**. o-phenylenediamine followed by deposition of a cation-exchange membrane (Eastman AQ 29D). The electrodes were used for detection of hydrogen peroxide, methanol, ethanol, propanol, isopropanol, and butanol. Preliminary investigations of the use of this sensor for bioprocess control are reported.
ST alc detection amperometric **biosensor** liq chromatog; **carbon paste** enzyme electrode alc detection
IT Alcohols, analysis
RL: ANT (Analyte); ANST (Analytical study)
(detection of, by liq. chromatog. with amperometric enzyme electrode)
IT Immobilization, biochemical
(of alc. **oxidase** and **peroxidase**, in **carbon paste** alc.-selective amperometric electrode)
IT Electrodes
(bio-, enzyme, alc.-selective, amperometric, **carbon paste**, in liq. chromatog. detector)
IT Chromatographs, column and liquid
(detectors, electrochem., amperometric alc.-selective enzyme electrode in)
IT 64-17-5, Ethanol, analysis 67-56-1, Methanol, analysis 67-63-0, Isopropanol, analysis 71-23-8, Propanol, analysis 71-36-3, Butanol, analysis 7722-84-1, Hydrogen peroxide, analysis
RL: ANT (Analyte); ANST (Analytical study)
(detection of, by liq. chromatog. with amperometric enzyme electrode)
IT **9003-99-0D, Peroxidase**, immobilized 9073-63-6D, Alcohol **oxidase**, immobilized
RL: ANST (Analytical study)
(in alc.-selective amperometric electrode for liq. chromatog. detection)
IT **7440-44-0, Carbon**, uses
RL: USES (Uses)
(**paste**, electrode, with immobilized enzymes, for alc. detn. by liq. chromatog.)
IT **9003-99-0D, Peroxidase**, immobilized
RL: ANST (Analytical study)
(in alc.-selective amperometric electrode for liq. chromatog. detection)
RN 9003-99-0 HCAPLUS
CN Peroxidase (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
IT **7440-44-0, Carbon**, uses
RL: USES (Uses)
(**paste**, electrode, with immobilized enzymes, for alc. detn. by liq. chromatog.)
RN 7440-44-0 HCAPLUS
CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

L77 ANSWER 30 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 1993:665773 HCAPLUS

DN 119:265773
TI Amperometric **biosensors** based on immobilized redox-enzymes in **carbon paste** electrodes
AU Gorton, L.; Dominguez, E.; Marko-Varga, G.; Persson, B.; Joensson-Pettersson, E.; **Csoregi, E.**; Johansson, K.; Narasaiah, D.; Ghobadi, S.
CS Dep. Anal. Chem., Univ. Lund, Lund, S-221 00, Swed.
SO Bioelectroanal., 2, Symp., 2nd (1993), Meeting Date 1992, 33-58. Editor(s): Pungor, Erno. Publisher: Akad, Kiado, Budapest, Hung. CODEN: 59LGAV
DT Conference
LA English
CC 9-7 (Biochemical Methods)
Section cross-reference(s): 7
AB A no. of redox enzymes have been immobilized in **carbon paste** electrodes operating around 0 mV vs. SCE. Examples are given of an alc. sensor based on alc. dehydrogenase, a fructose sensor based on fructose dehydrogenase, an L-lactate sensor based on co-immobilized L-lactate **oxidase** and a fungal **peroxidase**, and an L-glutamate sensor based on co-immobilized L-glutamate **oxidase** and horse radish **peroxidase**. The pos. effects on the sensor performances on the addn. of polyethyleneimine are demonstrated.
ST amperometric **biosensor** electrode redox enzyme
IT Immobilization, biochemical
(of redox enzymes on **carbon paste** electrodes in amperometric **biosensor** construction)
IT Electrodes
(bio-, enzyme, amperometric, paste, properties of, using redox enzymes)
IT Enzymes
RL: PROC (Process)
(redox, immobilization of, in amperometric **biosensor** electrode)
IT 9002-98-6
RL: ANST (Analytical study)
(redox enzyme properties in amperometric **biosensor** response to)

L77 ANSWER 31 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 1993:665610 HCAPLUS
DN 119:265610
TI Miniature amperometric **biosensors** for detection of hydrogen peroxide and glucose based on **peroxidase** modified **carbon fibers**
AU **Csoregi, Elisabeth**; Gorton, Lo; Marko-Varga, Gyorgy
CS Dep. Analy. Chem., Univ. Lund, Lund, S-221 00, Swed.
SO Bioelectroanal., 2, Symp., 2nd (1993), Meeting Date 1992, 271-84. Editor(s): Pungor, Erno. Publisher: Akad, Kiado, Budapest, Hung. CODEN: 59LGAV
DT Conference
LA English
CC 9-1 (Biochemical Methods)
AB A reagentless miniature amperometric **biosensor** can be constructed for the detn. of glucose by co-immobilizing horse radish **peroxidase** with the H2O2 producing glucose **oxidase** on **C fibers**. The detection is based on an apparent direct electron transfer between the electrode and the active center of the immobilized **peroxidase**. The detection can be made within the optimal potential range. The various optimization steps are described. A linear response range was obtained between 40-2500 .mu.M H2O2. Linear calibration curves for glucose were obtained between 20-160 .mu.M glucose. An av. conversion efficiency of glucose of 58% was calcd. as the ratio between the signal for glucose and for H2O2 from the linear calibration

curves.
ST **biosensor** hydrogen peroxide glucose detection; **peroxidase carbon fiber** enzyme electrode
IT **Carbon fibers**, uses
RL: USES (Uses)
(electrode, **peroxidase** immobilization on, for hydrogen peroxide detection by **biosensors**)
IT Electrodes
(bio-, enzyme, amperometric, with immobilized glucose **oxidase** and **peroxidase**, for hydrogen peroxide and glucose detection)
IT **7440-44-0**
RL: ANST (Analytical study)
(**carbon fibers**, electrode, **peroxidase** immobilization on, for hydrogen peroxide detection by **biosensors**)
IT 50-99-7, Glucose, analysis 7722-84-1, Hydrogen peroxide, analysis
RL: ANT (Analyte); ANST (Analytical study)
(detection of, by **peroxidase**-contg. **carbon fiber biosensors**)
IT **9003-99-0, Peroxidase**
RL: PROC (Process)
(immobilization of, on **carbon fibers biosensor**, for hydrogen peroxide detection)
IT **7440-44-0**
RL: ANST (Analytical study)
(**carbon fibers**, electrode, **peroxidase** immobilization on, for hydrogen peroxide detection by **biosensors**)
RN 7440-44-0 HCAPLUS
CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

IT **9003-99-0, Peroxidase**
RL: PROC (Process)
(immobilization of, on **carbon fibers biosensor**, for hydrogen peroxide detection)
RN 9003-99-0 HCAPLUS
CN Peroxidase (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L77 ANSWER 32 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 1992:644760 HCAPLUS
DN 117:244760
TI Amperometric **biosensors** based on an apparent direct electron transfer between electrodes and immobilized **peroxidases**
AU Gorton, Lo; Joensson-Pettersson, Gunilla; **Csoregi, Elisabeth**; Johansson, Kristina; Dominguez, Elena; Marko-Varga, Gyorgy
CS Dep. Anal. Chem., Univ. Lund, Lund, S-221 00, Swed.
SO Analyst (Cambridge, United Kingdom) (1992), 117(8), 1235-41
CODEN: ANALAO; ISSN: 0003-2654
DT Journal
LA English
CC 80-2 (Organic Analytical Chemistry)
Section cross-reference(s): 9
AB An apparent direct electron transfer between various electrode materials and **peroxidases** immobilized on the surface of the electrode has been reported in the last few years. An electrocatalytic redn. of hydrogen peroxide starts at about +600 mV vs. a satd. calomel (ref.) electrode (SCE) at neutral pH. The efficiency of the electrocatalytic

current increases as the applied potential is made more neg. and starts to level off at about -200 mV vs. SCE. Amperometric **biosensors** for hydrogen peroxide can be constructed with these types of **peroxidase** modified electrodes. By co-immobilizing a hydrogen peroxide-producing **oxidase** with the **peroxidase**, amperometric **biosensors** can be made that respond to the substrate of the **oxidase** within a potential range essentially free of interfering electrochem. reactions. Examples of glucose, alc. and amino acid sensors are shown.

ST **biosensor** amperometric coimmobilized **peroxidase** **oxidase**; glucose sensor coimmobilized **peroxidase** **oxidase**; alc sensor coimmobilized **peroxidase** **oxidase**; amino acid sensor coimmobilized **peroxidase** **oxidase**

IT **Biosensors**
(**amperometric**, based on coimmobilized **peroxidase** and **oxidase** for alcs. and amino acids and glucose)

IT Alcohols, analysis
Amino acids, analysis
RL: ANT (Analyte); ANST (Analytical study)
(detn. of, using amperometric sensor based on coimmobilized **peroxidase** and **oxidase**)

IT **Carbon fibers**, uses
RL: ANST (Analytical study); USES (Uses)
(hydrogen **peroxidase** immobilized on, in hydrogen peroxide amperometric sensor for anal.)

IT Electrodes
(amperometric, paste, **peroxidase** and **oxidase** coimmobilized on, for alcs. and amino acids and glucose detn.)

IT **Carbon fibers**, uses
RL: ANST (Analytical study); USES (Uses)
(**graphite**, hydrogen **peroxidase** immobilized on Polycarbon LGR, in hydrogen peroxide amperometric sensor for anal.)

IT 9073-63-6, Alcohol **oxidase**
RL: ANST (Analytical study)
(alc. amperometric **biosensor** based on coimmobilized **horseradish peroxidase** and, for detn. of alcs.)

IT 9000-89-9, L-Amino acid **oxidase**
RL: ANST (Analytical study)
(amino acid amperometric **biosensor** based on coimmobilized **peroxidase** and, for anal.)

IT **7440-44-0 7782-42-5**
RL: ANST (Analytical study)
(**carbon fibers**, **graphite**, hydrogen **peroxidase** immobilized on Polycarbon LGR, in hydrogen peroxide amperometric sensor for anal.)

IT **7440-44-0**
RL: ANST (Analytical study)
(**carbon fibers**, hydrogen **peroxidase** immobilized on, in hydrogen peroxide amperometric sensor for anal.)

IT 63-91-2, L-Phenylalanine, analysis 64-17-5, Ethanol, analysis 67-56-1, Methanol, analysis
RL: ANT (Analyte); ANST (Analytical study)
(detn. of, amperometric **biosensor** based on coimmobilized **peroxidase** and **oxidase** for)

IT 7722-84-1, Hydrogen peroxide, analysis
RL: ANT (Analyte); ANST (Analytical study)
(detn. of, by amperometric **biosensor** based on immobilized **peroxidase**)

IT 50-99-7, Glucose, analysis
RL: ANT (Analyte); ANST (Analytical study)
(detn. of, by using amperometric **biosensor** based on coimmobilized **peroxidase** and **oxidase**)

IT 9001-37-0, Glucose **oxidase**
RL: ANST (Analytical study)
(glucose amperometric sensor contg. coimmobilized **peroxidase** and, for anal.)
IT **9003-99-0, Peroxidase**
RL: ANST (Analytical study)
(**horseradish**, amperometric **biosensor** based on coimmobilized **oxidase** and, for detn. of alcs. and amino acids and glucose)
IT 9002-98-6
RL: ANST (Analytical study)
(in amperometric **biosensor** based on coimmobilized **peroxidase** and **oxidase**, for anal.)
IT 25667-98-5, Poly-o-phenylenediamine
RL: ANST (Analytical study)
(in amperometric **biosensor** based on immobilized **peroxidase** and **oxidase**)
IT 51774-88-0
RL: ANST (Analytical study)
(in amperometric **biosensor** based on immobilized **peroxidases** and **oxidase**)
IT 111-30-8, Glutaraldehyde 151-51-9, Carbodiimide
RL: ANST (Analytical study)
(in immobilization of **peroxidase** and **oxidase** in **carbon paste** electrode in prepn. of amperometric sensors)
IT 126851-11-4, AQ 29D
RL: ANST (Analytical study)
(membrane, in hydrogen peroxide amperometric **biosensor** based on immobilized **peroxidase**)
IT **7440-44-0 7782-42-5**
RL: ANST (Analytical study)
(**carbon fibers**, **graphite**, hydrogen **peroxidase** immobilized on Polycarbon LGR, in hydrogen peroxide amperometric sensor for anal.)
RN 7440-44-0 HCAPLUS
CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

RN 7782-42-5 HCAPLUS
CN Graphite (8CI, 9CI) (CA INDEX NAME)

C

IT **7440-44-0**
RL: ANST (Analytical study)
(**carbon fibers**, hydrogen **peroxidase** immobilized on, in hydrogen peroxide amperometric sensor for anal.)
RN 7440-44-0 HCAPLUS
CN Carbon (7CI, 8CI, 9CI) (CA INDEX NAME)

C

IT **9003-99-0, Peroxidase**
RL: ANST (Analytical study)
(**horseradish**, amperometric **biosensor** based on

coimmobilized **oxidase** and, for detn. of alcs. and amino acids and glucose)
RN 9003-99-0 HCAPLUS
CN Peroxidase (9CI) (CA INDEX NAME)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***

L77 ANSWER 33 OF 33 HCAPLUS COPYRIGHT 2003 ACS
AN 1991:534332 HCAPLUS
DN 115:134332
TI **Amino oxidase** amperometric **biosensor** for polyamines
AU Gasparini, Roberta; Scarpa, Marina; Di Paolo, Maria Luisa; Stevanato, Roberto; Rigo, Adelio
CS Dep. Biol. Chem., Padua Univ., Padua, 35100, Italy
SO Bioelectrochemistry and Bioenergetics (1991), 25(2), 307-15
CODEN: BEBEBP; ISSN: 0302-4598
DT Journal
LA English
CC 17-1 (Food and Feed Chemistry)
AB An improved **amino oxidase** enzyme **electrode** was constructed and applied to the detn. of the amt. of polyamines present in real samples. The **electrode** is based on the amperometric detection of H2O2 produced in the enzymic oxidn. of polyamines by **amino oxidase**. **Amino oxidase** from **soybean** seedlings, characterized by an extremely high activity for cadaverine and putrescine, was used. The enzyme was immobilized in an agarose matrix in the presence of glutaraldehyde and bovine serum albumin on the surface of a **Pt electrode**. Cadaverine, in concns. between 0.5 and 500 .mu.M, can be quant. detd. by use of the **amino oxidase electrode**, the linear calibration range being 0.5-10 .mu.M. The lower detection limit was 0.2 .mu.M and the response time was 15-60 s. Putrescine showed similar behavior. The max. current response for cadaverine was 5.1 .mu.A/cm2, with an apparent Km' of 0.175 mM. The **sensor** response was stable for >32 h of continuous operation at room temp. and, in the presence of fish or meat homogenates, no change in the signal-to-noise ratio was obsd. The long-term stability, pH, and temp. response of the **biosensor** also were studied.
ST polyamine detn enzyme **bioelectrode**; **amine oxidase electrode** polyamine detn
IT Michaelis constant
(of **amino oxidase** immobilized on amperometric **bioelectrode**)
IT Immobilization, biochemical
(of **amino oxidase**, in agarose matrix on **platinum electrode** surface, polyamine detn. in relation to)
IT Fish
(polyamines detn. in tissue homogenates of, with **amino oxidase** amperometric **bioelectrode**)
IT Food analysis
(polyamines detn. in, of tissue homogenates with **amino oxidase** amperometric **bioelectrode**)
IT **Electrodes**
(bio-, enzyme, amperometric, hydrogen peroxide-selective, with immobilized **amino oxidase**, for polyamine detn., characterization of)
IT Amines, analysis
RL: ANT (Analyte); ANST (Analytical study)
(poly-, detn. of, in tissue homogenates with **amino oxidase** amperometric **bioelectrode**)
IT Meat

(veal, polyamines detn. in tissue homogenates of, with **amino oxidase** amperometric **bioelectrode**)
IT 7722-84-1, Hydrogen peroxide, analysis
RL: ANT (Analyte); ANST (Analytical study)
(detn. of, by **amino oxidase** enzyme **electrode**, polyamine detn. in relation to)
IT 71-44-3, Spermine 110-60-1, Putrescine 124-20-9, Spermidine 462-94-2, Cadaverine
RL: ANT (Analyte); ANST (Analytical study)
(detn. of, in tissue homogenates with **amino oxidase** amperometric **electrode**)
IT 9000-89-9
RL: BIOL (Biological study)
(immobilized, in agarose matrix on **platinum electrode**, for polyamine detn. in tissue homogenates)

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(FILE 'HOME' ENTERED AT 10:01:49 ON 17 JAN 2003)
SET COST OFF

FILE 'HCAPLUS' ENTERED AT 10:02:04 ON 17 JAN 2003
E CSOREGI E/AU
L1 48 S E3-E5
E MICULESCU M/AU
E NICULESCU M/AU
L2 26 S E3,E12
E FREBORT I/AU
L3 68 S E3,E4
E WO2000-SE1449/AP,PRN
L4 1 S E3,E4
E SE99-2608/AP,PRN
L5 1 S E4
L6 1 S L1-L3 AND L4,L5
E FORSKARPATENT/PA,CS
L7 26 S E3-E20
L8 16015 S BIOSENSOR OR BIO SENSOR
L9 32 S L1-L3 AND L8
L10 3 S L7 AND L8

FILE 'REGISTRY' ENTERED AT 10:05:26 ON 17 JAN 2003
L11 1 S 9003-99-0
L12 1 S 9059-11-4
E AMINE OXIDASE/CN
E PEROXIDASE/CN
L13 1 S L11 AND ?PEROXIDASE?/CNS
L14 1 S L12 AND (AMINE(L)OXIDASE)/CNS

FILE 'HCAPLUS' ENTERED AT 10:07:22 ON 17 JAN 2003
L15 1848 S L14
L16 3429 S AMINEOXIDASE OR AMINE OXIDASE
L17 30631 S L13
L18 77352 S ?PEROXIDASE?
L19 3448 S L15,L16
L20 78099 S L17,L18
E BIOSENSOR/CT
L21 4526 S E5-E29
E E4+ALL
L22 10181 S E7
E E6+ALL
L23 21517 S E4,E5
L24 17 S L19 AND L8

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L25          11 S L19 AND L21-L23
L26           6 S L24,L25 AND L20
L27          19 S L24,L25,L26
L28           6 S L6,L9,L10 AND L27
L29          28 S L6,L9,L10 NOT L28
L30           1 S L27 AND REDOX(L)HYDROGEL
L31           6 S L29 AND REDOX(L)HYDROGEL
L32           9 S L27 AND (GOLD OR SILVER OR PLATINUM OR PALLADIUM OR COPPER OR
L33          19 S L29 AND (GOLD OR SILVER OR PLATINUM OR PALLADIUM OR COPPER OR

     FILE 'REGISTRY' ENTERED AT 10:12:20 ON 17 JAN 2003
L34           6 S (PALLADIUM OR PLATINUM OR SILVER OR GOLD OR CARBON OR GRAPHIT

     FILE 'HCAPLUS' ENTERED AT 10:12:37 ON 17 JAN 2003
L35           5 S L34 AND L27
L36           9 S L34 AND L29
L37           4 S L27 AND (OSMIUM OR OS)
L38           6 S L29 AND (OSMIUM OR OS)

     FILE 'REGISTRY' ENTERED AT 10:14:00 ON 17 JAN 2003
L39           1 S 25232-42-2

     FILE 'HCAPLUS' ENTERED AT 10:14:54 ON 17 JAN 2003
L40           2 S L39 AND L27
L41           3 S L39 AND L29

     FILE 'REGISTRY' ENTERED AT 10:15:46 ON 17 JAN 2003
L42           1 S 26403-72-5
L43           1 S 7440-04-2

     FILE 'HCAPLUS' ENTERED AT 10:15:57 ON 17 JAN 2003
L44           2 S (L42 OR L43) AND L27
L45           4 S (L42 OR L43) AND L29
L46          19 S L27,L28,L30,L32,L35,L40,L44

     FILE 'REGISTRY' ENTERED AT 10:16:53 ON 17 JAN 2003
L47           1 S 7440-50-8

     FILE 'HCAPLUS' ENTERED AT 10:16:59 ON 17 JAN 2003
L48           2 S L47 AND L27
L49           5 S L47 AND L29
L50          19 S L46,L48

     FILE 'REGISTRY' ENTERED AT 10:18:26 ON 17 JAN 2003
L51           1 S 1134-35-6

     FILE 'HCAPLUS' ENTERED AT 10:18:33 ON 17 JAN 2003
L52           1 S L51 AND L27
L53           1 S L51 AND L29
L54          19 S L50,L52
L55          19 S L54 AND (?SENSOR? OR ?ELECTRODE? OR ?OXIDASE? OR AMIN# OXIDAS
L56           4 S L55 AND ?GRAPHITE?
L57           5 S L55 AND (C OR CARBON)
L58           8 S L56,L57
L59           8 S L55 AND ?POLYM?
L60          11 S L58,L59
L61           3 S L55 AND PEA
L62          19 S L55,L61
                SEL DN AN 1 2
L63          17 S L62 NOT E1-E6
L64          23 S L31,L33,L36,L38,L41,L45,L49,L53
L65           5 S L29 NOT L62,L64
                SEL DN AN 1 3
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L66           3 S L65 NOT E7-E12
L67          20 S L63,L66
                SEL DN AN 1 3 6 8 13 14 15 16 17
                DEL SEL
                SEL DN AN 1 3 6 8 13 14 15 16 17  L64
L68          14 S L64 NOT E1-E25
                SEL DN AN 10
L69          13 S L68 NOT E26-E28
L70          33 S L67,L69 AND L1-L10,L15-L33,L35-L38,L40,L41,L44-L46,L48-L50,L5
L71          29 S L70 AND (PEA OR SWEET(L)POTATO OR HORSERADISH OR SOYBEAN OR S
L72          15 S L70 AND (?POLYM? OR POLY ETHYLENEGLYCOL DIGLYCIDYL ETHER OR V
L73           4 S L70 AND (POLY ETHYLENE GLYCOL DIGLYCIDYL ETHER)
L74          33 S L70-L73
L75           7 S L74 AND (C OR CARBON)(L)(PASTE# OR FIBER OR FIBRE OR VITROUS)
L76           9 S L74 AND GRAPHITE
L77          33 S L74-L76

     FILE 'HCAPLUS' ENTERED AT 10:35:52 ON 17 JAN 2003
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